1． Maintenance

1-1.Maintenance Part Chart

No	Name	Part Number	Part Using Hours （Unit hours）					
			2、000	4、000	6、000	8、000	10、000	12、000
.	Tape Path Cleaning		△Clean the Tape Path at each 500 hours					
1	Cylinder Unit	VEG1337	●	●	●	●	●	◎
2	Cleaning Arm Unit	VXL2748	●	●	●	●	●	◎
3	Pinch Arm Unit	VXL2835		●■		●■		◎
4	S Reel Motor Unit	VEM0635			●			◎
5	T Reel Motor Unit	VEM0636			●			◎
6	Thrust Screw Unit	VXQ0556			●▲			◎
7	Front Loading Unit	VXA6070						●
8	Mech. Chassis Unit (NTSC)	VXY1355Z1						●
8	Mech. Chassis Unit (PAL)	VXY1426Z1						●
9	Fan Motor	VRF0193	Replace the Fan Motor at each 10,000 hours ***Operation Time***					
10	LCD Unit (NTSC)	EDTCA03Q5F	Replace the LCD Unit at each 10,000 hours ***Operation Time***					
10	LCD Unit (PAL)	EDTCA03QAF	Replace the LCD Unit at each 10,000 hours ***Operation Time***					

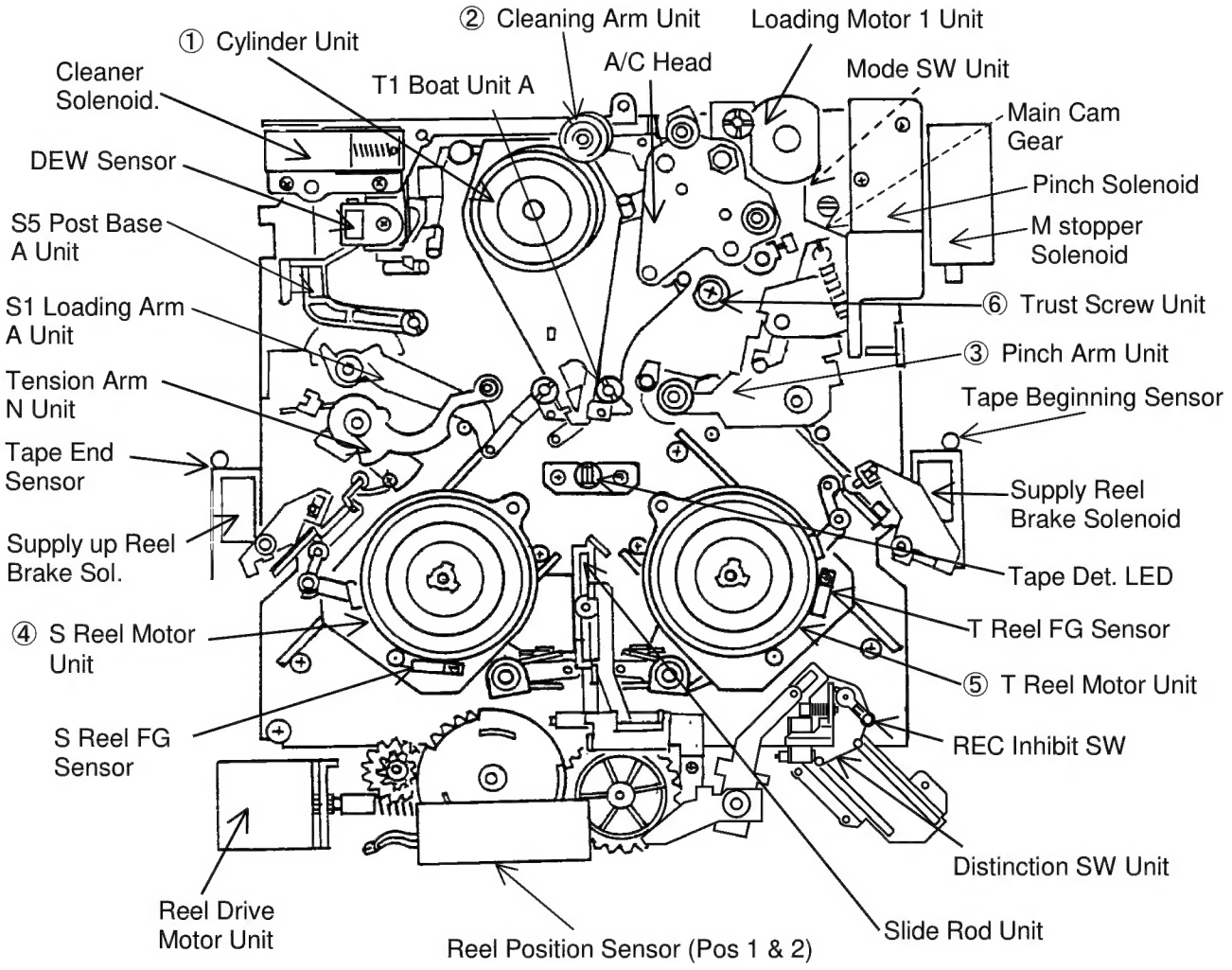
Note: Using hours are based on the head rotation hours.

Using hours are recommendation. It may depended on temperature, humidity or dusty.

Using hours are listed as the reference of maintenance. They do not mean guarantee Hours.

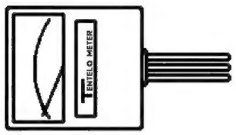
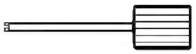
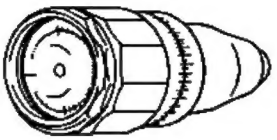
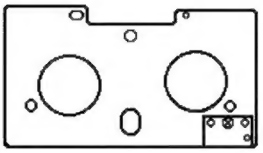
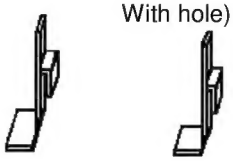
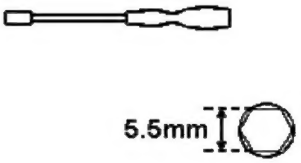
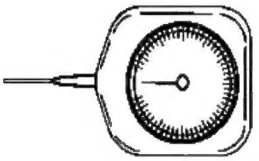
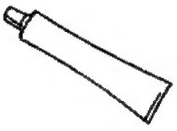
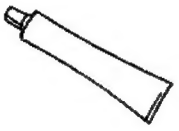
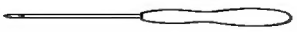
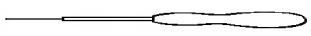
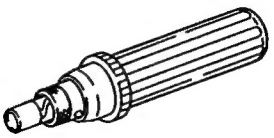
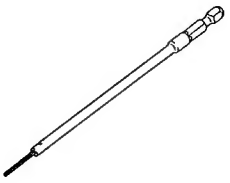
Symbol	Maintenance	Remark
●	Replacement	
◎	Replacement	These parts are included in Mech Chassis Unit
■	Greasing	Wipe the old grease and apply new grease
△	Cleaning	This mark means cleaning is necessary
▲	Lubrication	The lubrication is necessary

1-2. Sensors Layout

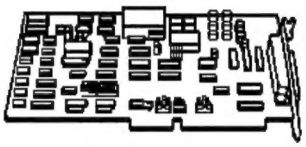


1－3. Servicing Fixtures &Tools

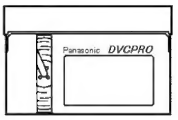
Fig	ITEM	PART No.	JIG & EQUIPMENT	AJ-D750	Remark
1	Jig Tool	VFK1145	Back Tension Meter(T2-M30-P)	yes	
2		VFK1149	Post Driver	yes	
3		VFK71	Dial Torque Gauge(150g)	yes	
4		VFK1191	Dial Torque Gauge(45g)	yes	
5		VFK1152	Dial Torque Gauge Adaptor	yes	
6		VFK0357	Eccentric Screwdriver(1.5)	yes	
7		VFK1154	Post Height Fixture	yes	
8		VFK1153	Mech. Neutral Plate(Post)	yes	
9		VFK0906	Oil	yes	
10		VFK1155	REV Position Tool(Silver)	yes	
11		VFK1156	PLAY Position Tool(Black)	yes	
12		VFK1208	Neutral Position Tool(Black With Hole)	yes	
13		VFK1150	Nut Driver(5.5mm)	yes	
14		VFK1151	Nut Driver(2.5mm)	yes	
15		VFK1188	Dial Tension Gauge(30g)	yes	
16		VFK0948A	Check Light	yes	
17		VFK0749	Froiral Grease (for plastic)	yes	
18		MOR265	Morlytone Grease (for metal)	yes	
19		VFK1146	Philips Driver(Fine)(00-75)	yes	
20		VFK1147	Philips Driver(Fine)(0-100)	yes	
21		VFK1148	Hex.Driver(1.5)	yes	
22		VFK1178	Hex.Driver(0.89)	yes	
23		VFK1179	Hex.Driver(0.71)	yes	
24		VFK1190	HEX. Wrench	yes	
25		VFK1209	Torque Driver(0.4-3Kg)	yes	
26		VFK1375	Post Axis Driver(1.5mm)	yes	or VFK0912
27		VFK1300	A/D Board(DAQ-12, Quatech)	yes	※Note
28		VFM3580KM	Alignment Tape(No.1)	yes	for NTSC
29		VFM3581KM	Alignment Tape(No.2)	yes	for NTSC
30		VFM3582KM	Alignment Tape(No.3)	yes	for NTSC
31		VFM3680KM	Alignment Tape(No.1)	yes	for PAL
32		VFM3681KM	Alignment Tape(No.2)	yes	for PAL
33		VFM3682KM	Alignment Tape(No.3)	yes	for PAL
34		VFM3000EDS	Alignment Tape(DV LISTA)	yes	
35		VFM3010EDS	Alignment Tape(DV Color Bar)	yes	for NTSC
36		VFM3110EDS	Alignment Tape(DV Colour Bar)	yes	for PAL
37		AJ-CL12MP	Cleaning Tape	yes	
38		VFK1481	LISTA Software	yes	
39		VFK1186	LISTA Cable	yes	
40		VFK1423	Tape Det.Sensor Cassette	yes	
41		VZZ0095	Cleaning Cross	yes	
42		VFK1248A	Flash ROM Version Up Software		
43		VFK1304A	ROM Rewriter		
44		VFK1305	120P Extender		
45		VFK1307	70P Extender		
46		VFK1306	52P Extender		
47		VFK0369	Tweezers	yes	
48		VFK0371	Radio Prier	yes	
49		VFK0372	Cutter Prier	yes	
50		VFK0338	Trimmer Adjustment Driver	yes	
51		VFK0337	Philips Driver	yes	

1 VFK1145 Back Tension Meter  Model:T2-M30-P	2 VFK1149 Post Driver 	3 VFK71 (150g) 4 VFK1191(45g) Dial Torque Gauge 	5 VFK1152 Dial Torque Gauge Adapter
6 VFK0357(ϕ 1.5) Eccentric Screwdriver 	7 VFK1154 Post Height Fixture 	8 VFK1153 Mech Neutral Plate(Post) 	9 VFK0906 OIL (for Thrust Adjustment screw)
10 VFK1155 (REV, Silver) 11 VFK1156 (PLAY, Black) 12 VFK1208(Neutral,Black With hole)  (Gold) (Black)	13 VFK1150 Nut Driver(5.5mm)  5.5mm	14 VFK1151 Nut Driver(2.5mm) 2.5mm	15 VFK1188(30g) Dial Tension Gauge 
16 VFK0948(or purchase locally) Check Light 	17 VFK0749 Froiral Grease(White) (for plastic part) 	18 MOR265 Morlytone Grease(Black) (for metal part) 	19 VFK1146 (00 x 75) 20 VFK1147 (0 x 100) Philips Driver 
21 VFK1148(1.5mm) 22 VFK1178(0.89mm) 23 VFK1179(0.71mm) Hex. Driver 	24 VFK1190 (1.5mm) Hex. Wrench 	25 VFK1209 Torque Driver(0.4-3Kg) 	26 VFK1375 or VFK0912 Post Axis Driver(1.5mm) 

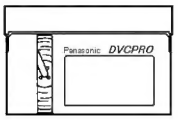
27 VFK1300
A/D Converter Board
(For Quatech. DAQ-12
Purchase Locally)



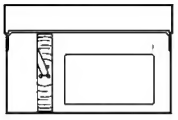
28 VFM3580KM
29 VFM3581KM
30 VFM3582KM
DVC PRO Alignment Tape
(for NTSC)



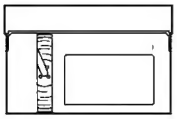
31 VFM3680KM
32 VFM3681KM
33 VFM3682KM
DVC PRO Alignment Tape
(for PAL)



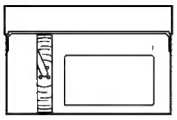
34 VFM3000EDS
DV Alignment Tape
(LISTA)



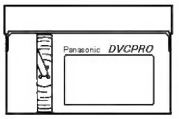
35 VFM3010EDS
DV Alignment Tape
(Color Bar : for NTSC)



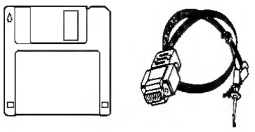
36 VFM3010EDS
DV Alignment Tape
(Colour Bar : for PAL)



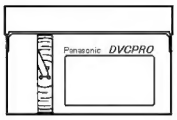
37 AJ-CL12MP
Cleaning Tape



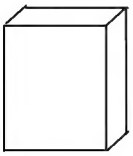
38 VFK1481
LISTA Software
39 VFK1186
LISTA Cable



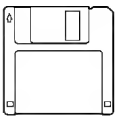
40 VFK1423
Tape Det. Sensor
Cassette



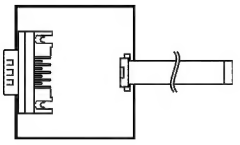
41 VZZ0095
Cleaning Cross



42 VFK1248A
Flash ROM Version
Up Software



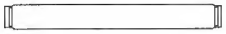
43 VFK1304A
ROM Rewriter



Flexible Cable is available
Part No.:VWJ20E5500L0

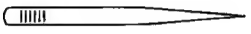
44 VFK1305
120P Extender

45 VFK1307
70P Extender

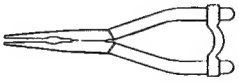


46 VFK1306
52P Extender

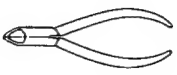
47 VFK0369
Tweezers



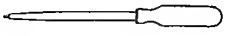
48 VFK0371
Radio Prier



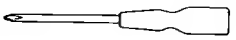
49 VFK0372
Cuntter Prier



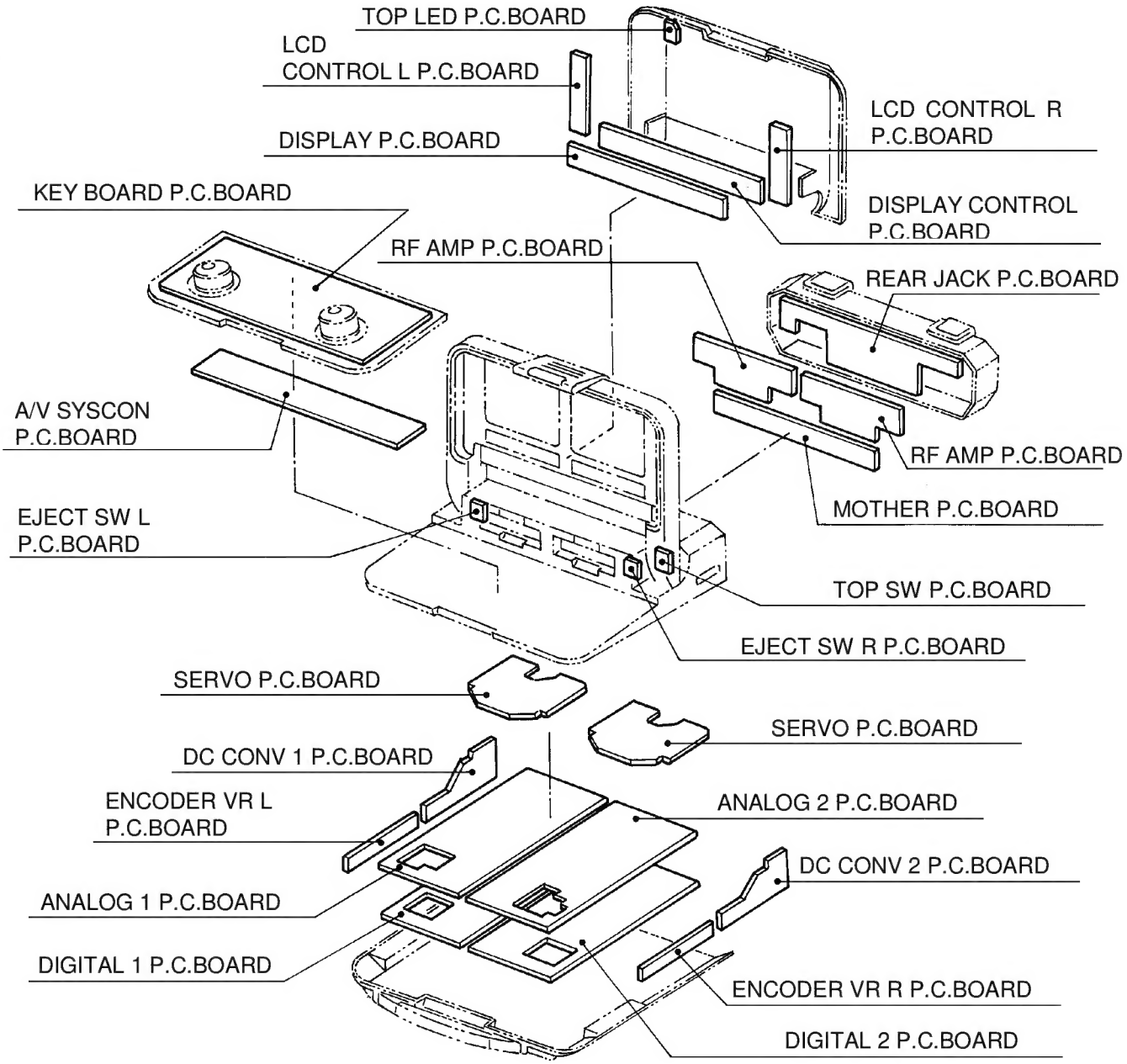
50 VFK0338
Trimmer Adjustment Driver



51 VFK0377
Philips Driver



1-4. Boards Location



5. Alignment Tapes

DVCPRO Alignment Tape

VFM3580KM(NTSC)

Time	Video		PCM		CUE	
(min)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color Bar SMPTE(75%)	Composite Video Level Confirmation	1kHz -20dB	Audio Level Confirmation	1kHz 0VU	CUE Level Confirmation
7:00	Color Bar Full Field(75%)	Component Video Level Confirmation				
14:00	H Sweep	Frequency Response			6kHz 0VU	A/C Head Azimuth
18:00	Bowtie(500k)	Y/C Timing				
22:00	Pulse&Bar	Y/C Timing			-10dB, 1kHz 50Hz～15kHz	Frequency Response
26:00 30:00	Area Markers					

VFM3581KM(NTSC)

Time(min)	Signal
0:00～20:00	ITI Pattern

VFM3582KM(NTSC)

Time(min)	Signal
0:00～10:00	X Value

VFM3680KM (PAL)

Time	Video		PCM		CUE	
(min)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color Bar 100%	Video Level Confirmation	1kHz -18dBu	Audio Level Confirmation	1kHz Reference level	CUE Level Confirmation
10:00	H Sweep	Frequency Response				
14:00	Area Markers				6kHz Reference level	A/C Head Azimuth
18:00	Bowtie(500k)	Y/C Timing				
22:00	Pulse & Bar	Y/C Timing			1kHz 300Hz~6kHz	Frequency Response
26:00 30:00	Multi Pulse	Y/C Timing				

VFM3681KM (PAL)

Time (min)	Signal
0:00 ~ 20:00	ITI Pattern

VFM3682KM (PAL)

Time (min)	Signal
0:00 ~ 10:00	X Value

Recommended Test And Service Equipment

NTSC

Part No.	Name	Remark
TSG130A(OP.04)	Analog Component Signal Generator	TEKTRONIX
	Oscilloscope	
1750(OP.SC) or 1780R	WFM Monitor	TEKTRONIX
	Digital Volt Meter	
	Frequency Counter	
	VTVM	Frequency Band Width 4Hz-500KHz
	Audio Analyzer	

PAL

Part No.	Name	Remark
TSG131A(OP.04)	Analog Component Signal Generator	TEKTRONIX
	Oscilloscope	
1751(OP.SC) or 1781R	WFM Monitor	TEKTRONIX
	Digital Volt Meter	
	Frequency Counter	
	VTVM	Frequency Band Width 4Hz-500KHz
	Audio Analyzer	

2. Disassembly Method

2-1. Removal of Top Case Unit

1. Pull the Lever and release the lock.

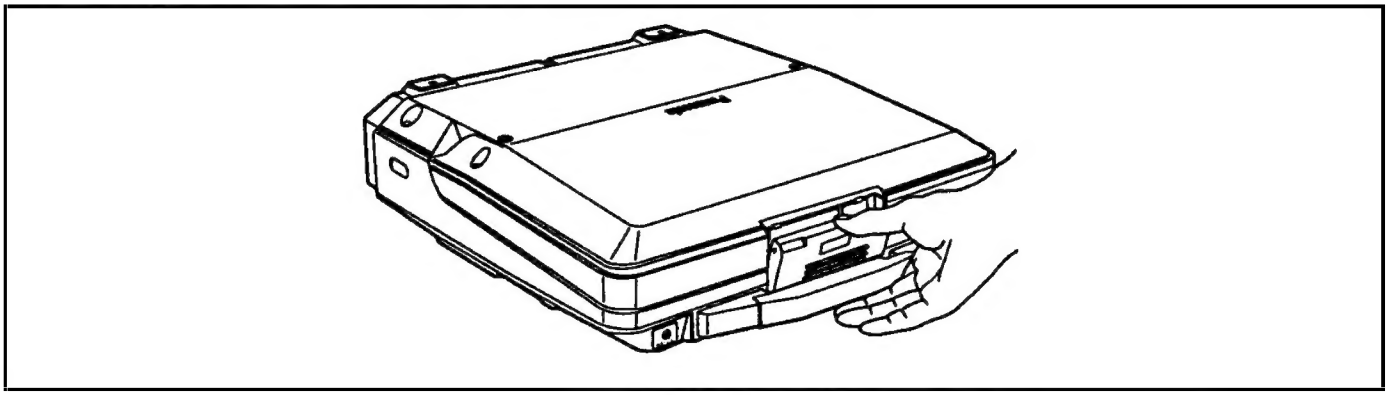


Figure 1

2. Loosen the 4 screws (A) and remove the Top Case Unit as shown in Figure 2.

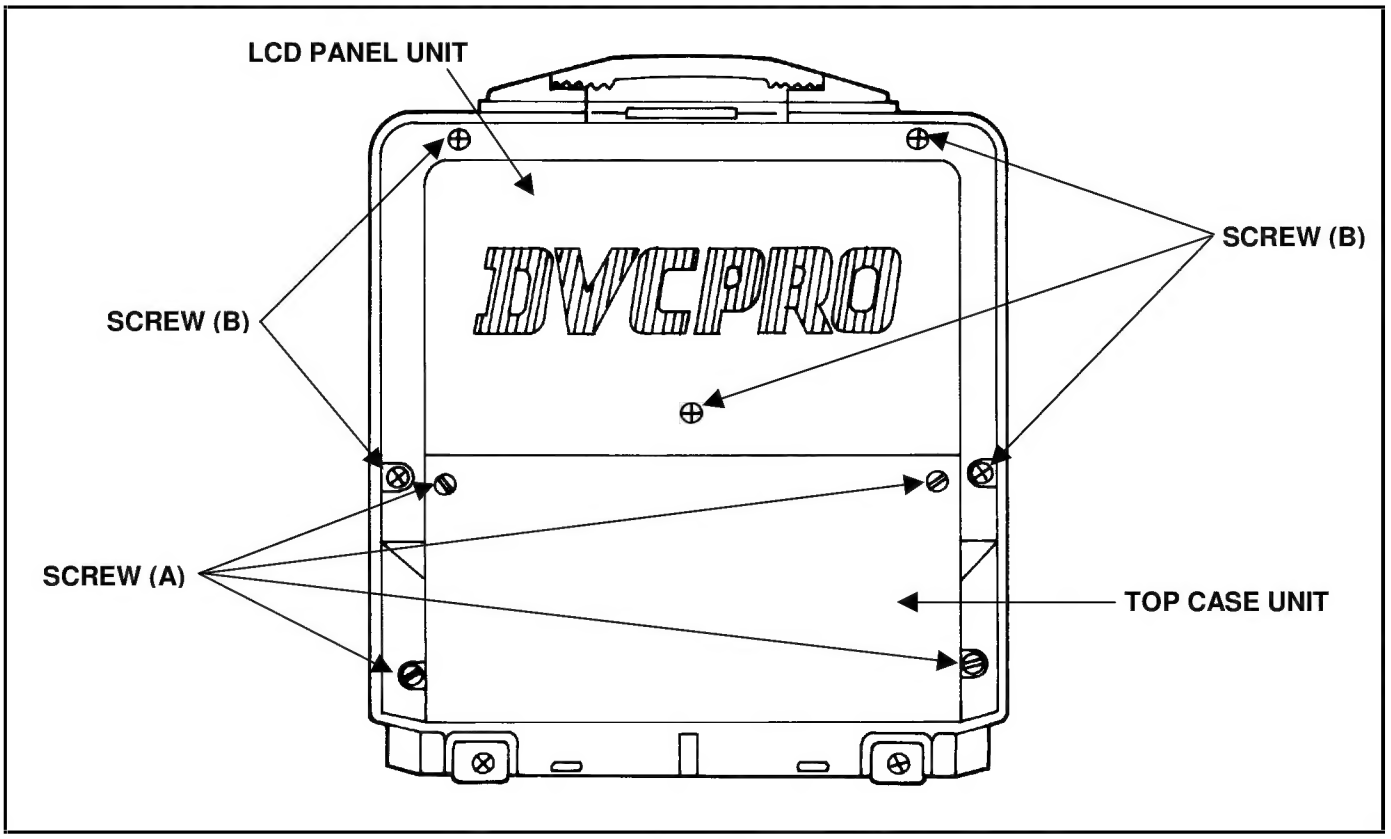


Figure 2

2-2. Removal of LCD Panel Unit

1. Unscrew the 5 screws (B) and remove the LCD Panel Unit as shown in Figure 2.

2-3. Removal of Bottom Case Unit

1. Unscrew the 7 screws and remove the Bottom Case Unit as shown in Figure 3.

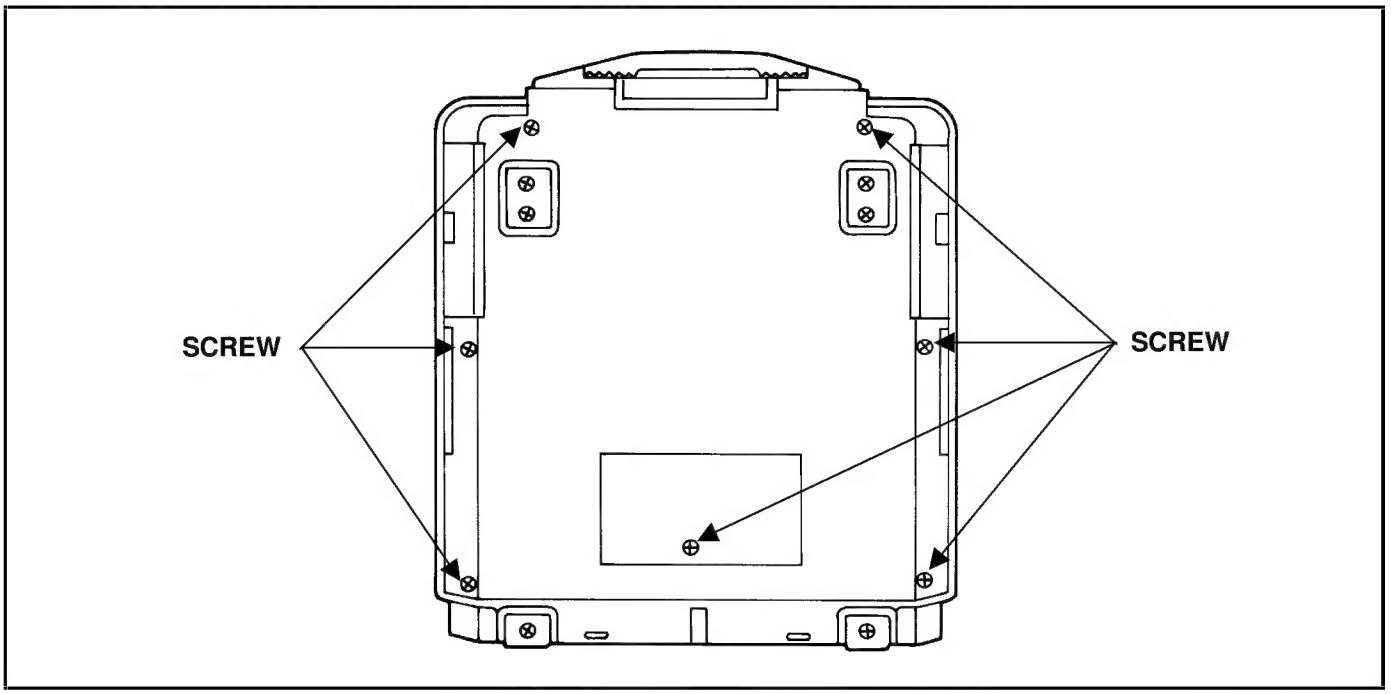


Figure 3

2-4. Open the P.C.Board Unit

Note: P.C.Board Unit is combined Digital 1, Digital 2, Analog 1, Analog 2, DC Conv 1, DC Conv 2, Encoder L and Encoder R P.C.Board.

1. Unscrew the 3 screws and open the P.C.Board Unit as shown in Figure 4.

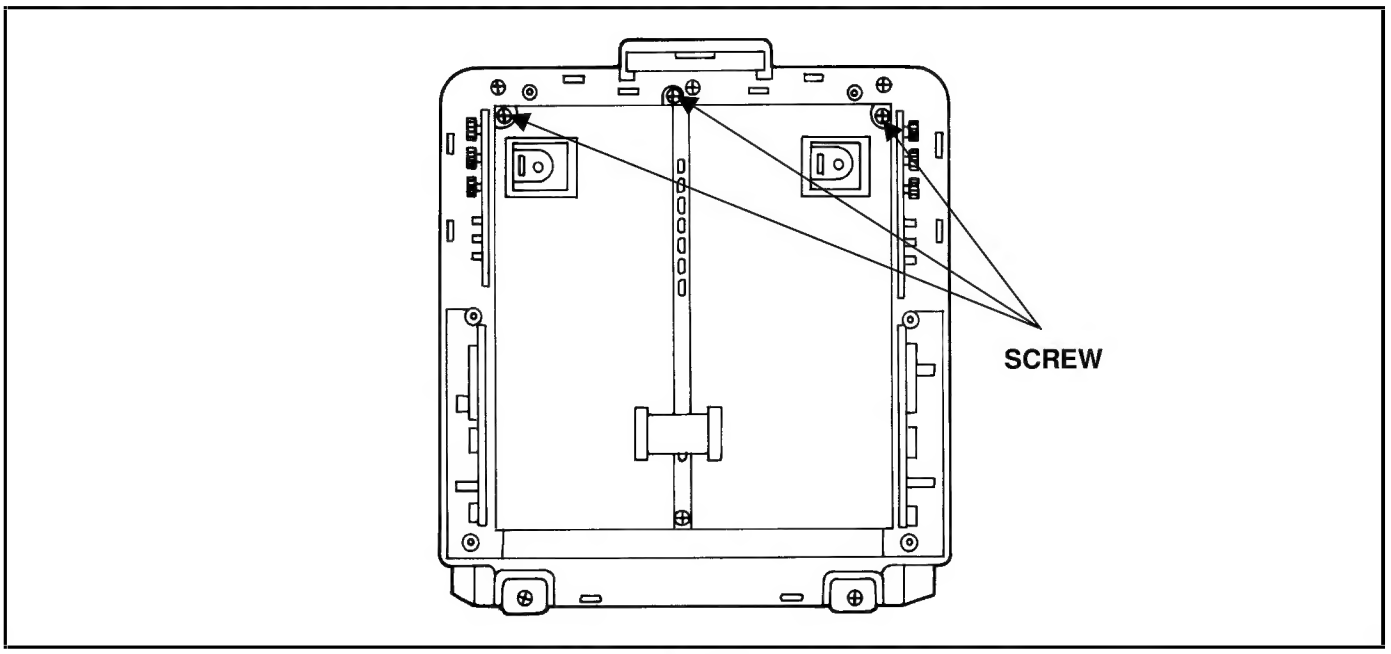


Figure 4

2-5. Removal of Key Panel Unit

1. Remove the Bottom Case Unit.
2. Open the P.C.Board Unit.
3. Unscrew the 3 screws (B) and disconnect the connector (A): P61901, (B): P60601, (C): P61301, (D): P61601 on the A/V SYSCON P.C.Board as shown in Figure 5.
1. Lift up the Key Panel Unit and disconnect the connector (E): P65007, (F): P65008 on the Key board as shown in Figure 5.

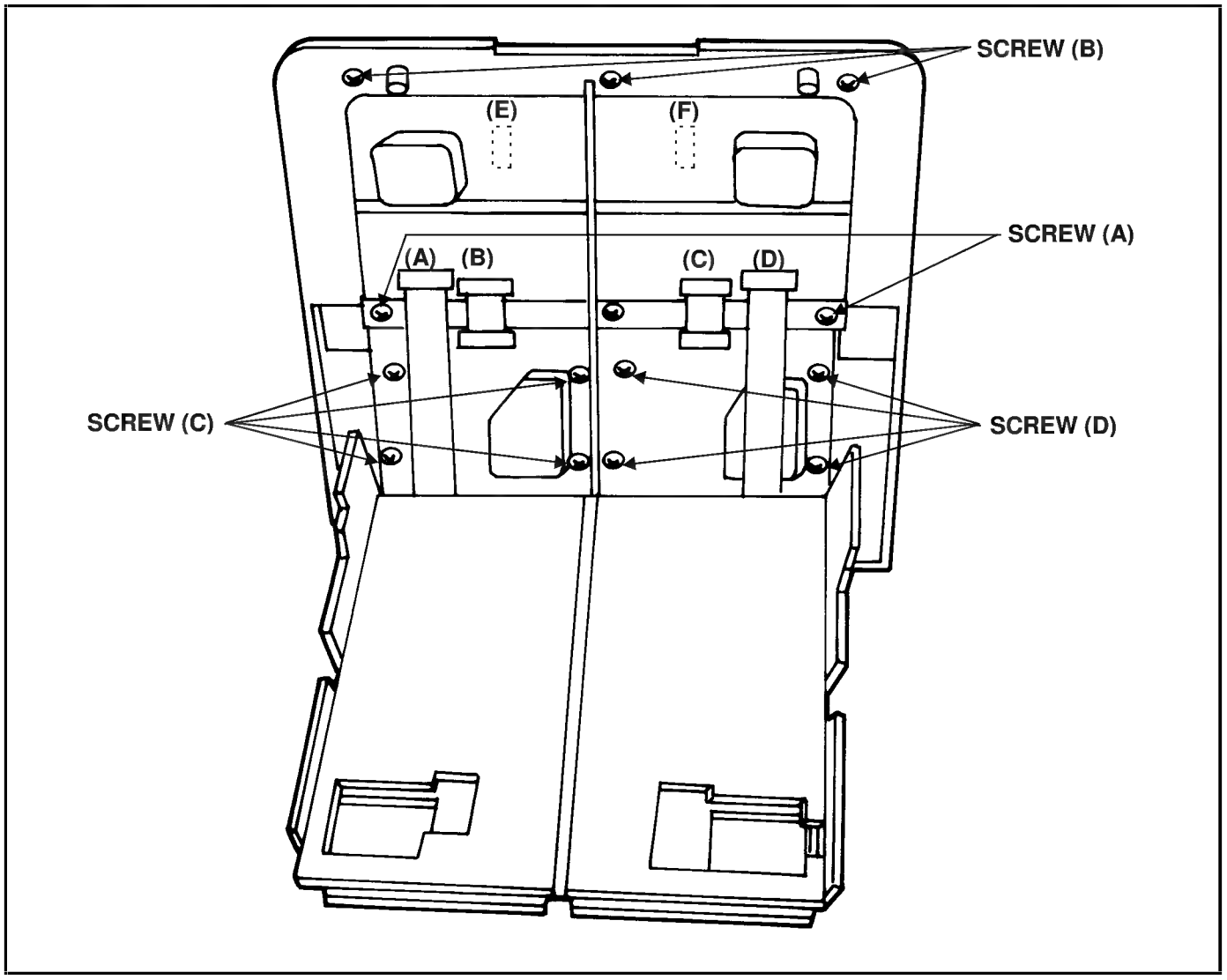


Figure 5

2-6. Removal of Front Panel

1. Remove the Top Case Unit.
2. Remove the Bottom Case Unit.
3. Open the P.C.Board Unit.
4. Remove the Key Panel Unit.
5. Unscrew the 3 screws (A) as shown in Figure 5.
6. Unscrew the 2 screws at left and right side, then remove the Front Panel as shown in Figure 6.

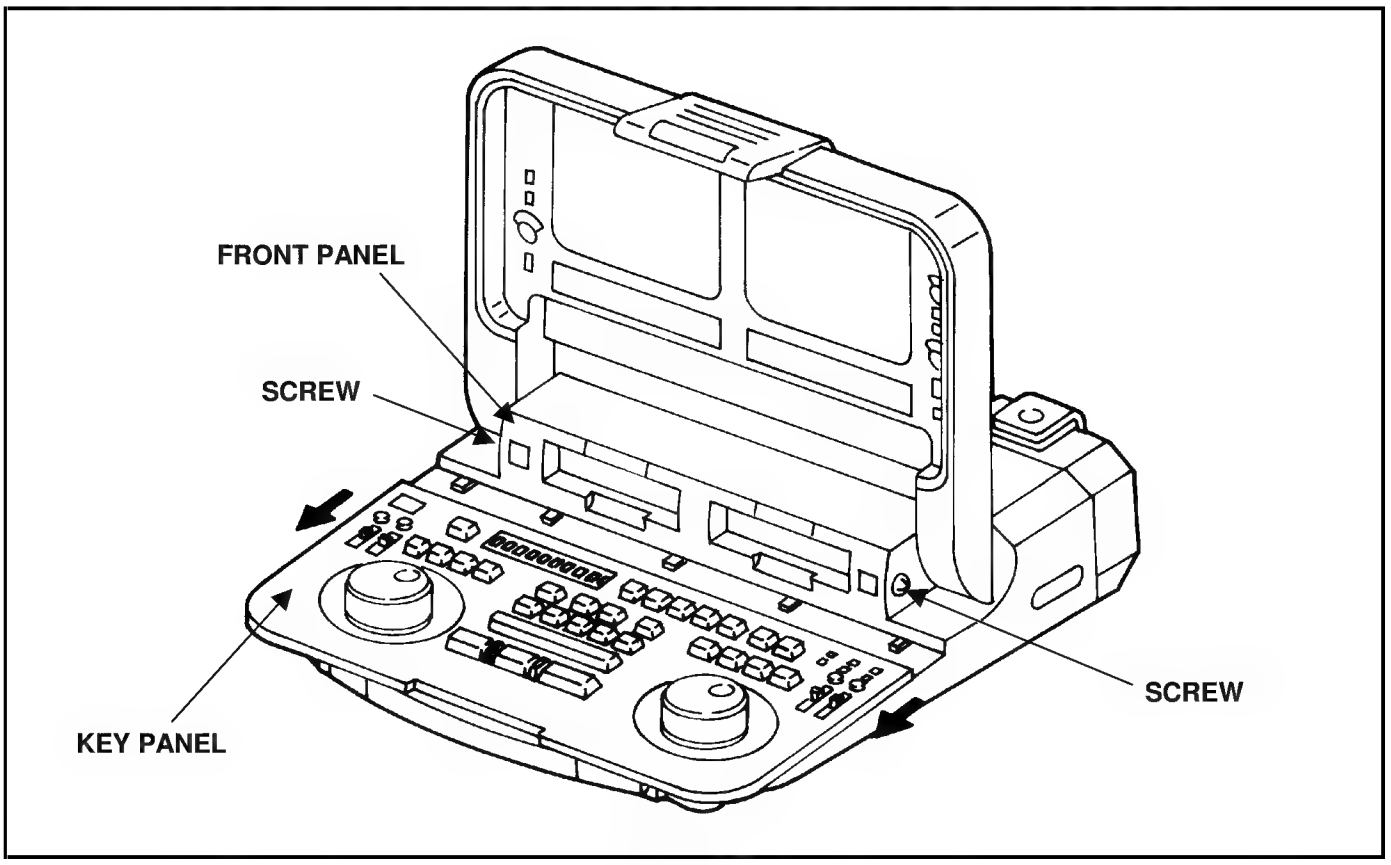


Figure 6

2-7. Removal of Front Loading Unit

1. Remove the LCD Panel Unit.
2. Disconnect the 2 connectors at Front Loading motor part and mechanism interconnection board as shown in Figure 7.
3. Disconnect the connector P5004 for A/C Head cable on the RF AMP P.C.Board as shown in Figure 7.
4. Rotate the red plastic screw in front of the worm gear of the cassette down motor counterclockwise by a Philips-head screw-driver pushing the screw to move the Cassette Holder Unit the 2 screws (A) can be removal position as shown in Figure 7.
5. Unscrew the 4 screws (A) and (B), then remove the Front Loading Unit.

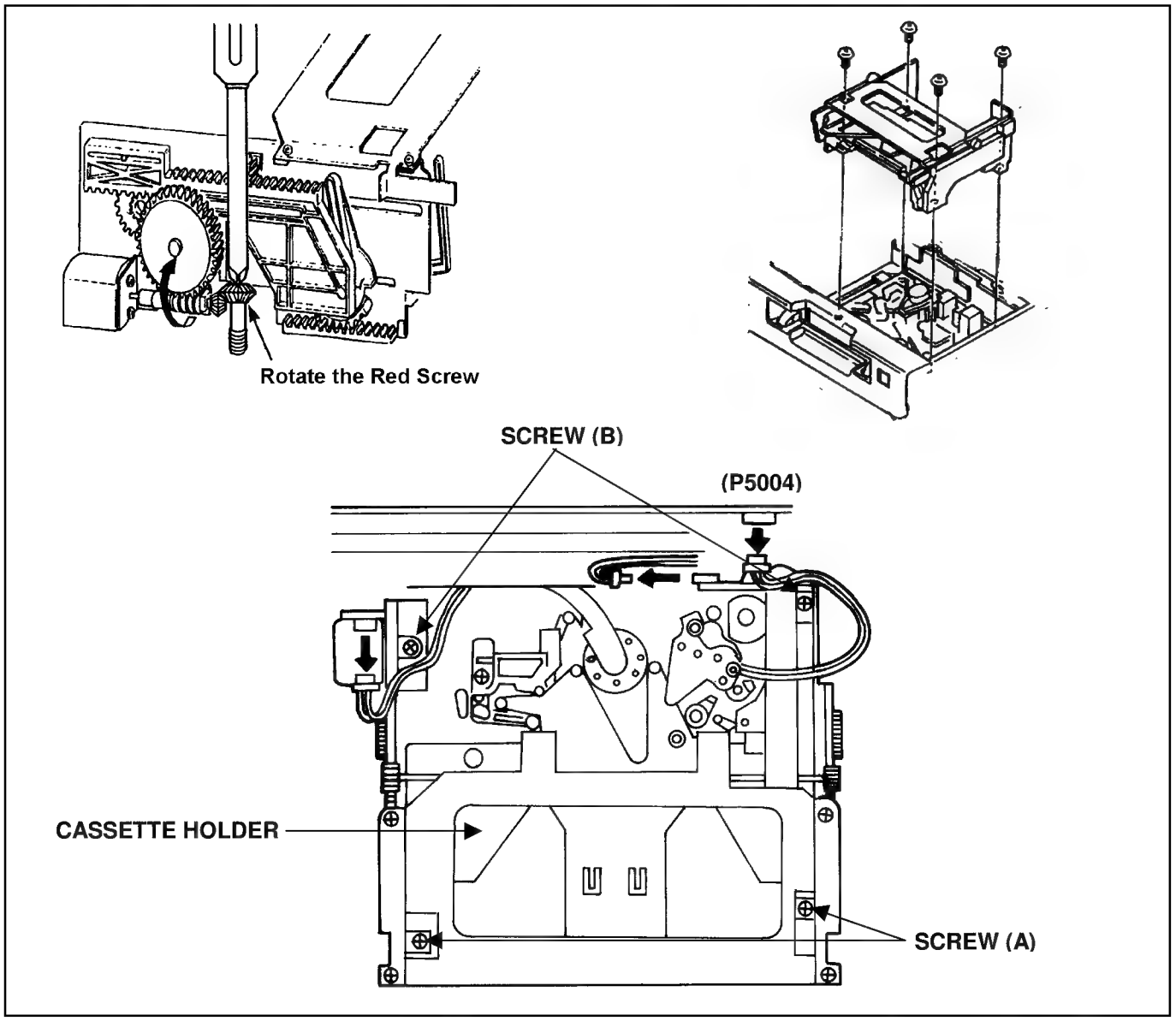


Figure 7

2-8. Removal of Cylinder Unit

1. Remove the Top Case Unit.
2. Remove the Bottom Case Unit.
3. Open the P.C.Board Unit.
4. Disconnect the connector (A): P61901 and (D): P61601 on the A/V SYSCON P.C.Board as shown in Figure 5.
5. Unscrew the 4 screws (C) for VTR 1 and 4 screws (D) for VTR 2, then remove the Shield Plate shown in Figure 5.
6. Disconnect the connector (A): P2033 on the Servo P.C.Board.

Note: In the case of remove the Cylinder Unit at VTR 1 side, then the connector (B): P2001 have to removed.

7. Unscrew the 3 screws (A), which have spring from the Cylinder unit as shown in Figure 8.

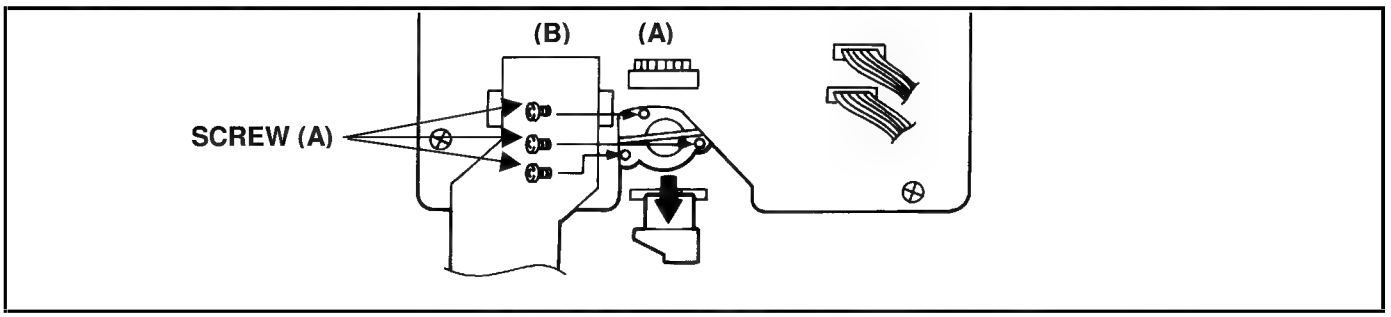


Figure 8

8. Disconnect the connector P5002 and P5003 on the RF AMP P.C.Board and unscrew the screw which is attached with the flexible board connector, then remove the cylinder unit without touching any mechanism parts as shown in Figure 9.

Note: Be careful when remove the flexible cable from the connector.
Please refer to how to remove the connector as shown in Figure 10.

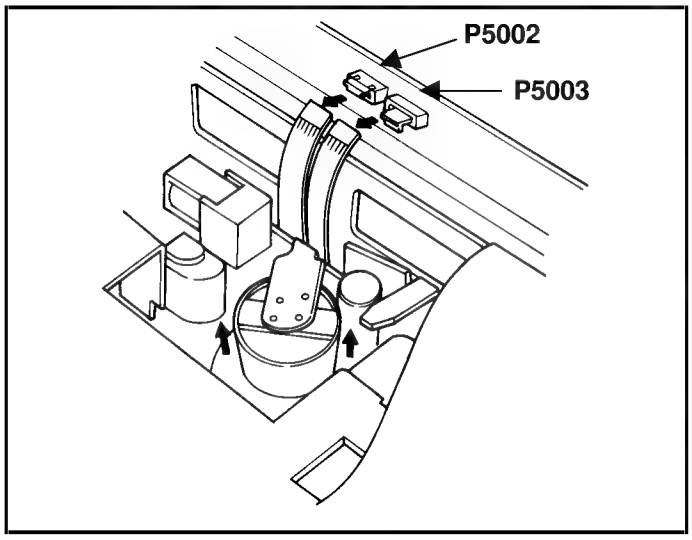


Figure 9

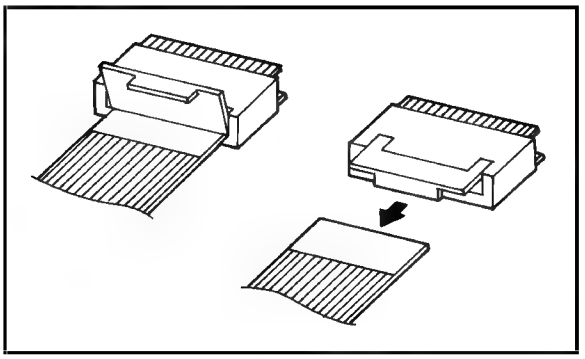


Figure 10

2-9. Removal of Mech Chassis Unit

1. Remove the Top Case Unit.
2. Remove the Bottom Case Unit.
3. Open the P.C.Board Unit.
4. Disconnect the connector (A): P61901 for VTR 1 and (D): P61601 for VTR 2 on the A/V SYSCON P.C.Board as shown in Figure 5.
5. Remove the Shield Plate (Refer to item 2-8).
6. Disconnect the connector (B): P2001, (C): P2002 on the Servo P.C.Board as shown in Figure 8.
7. Remove the Front Loading Unit.
8. Disconnect the connector P5002 and P5003 on the RF AMP P.C.Board and unscrew the 3 screws and remove the mechanism unit.

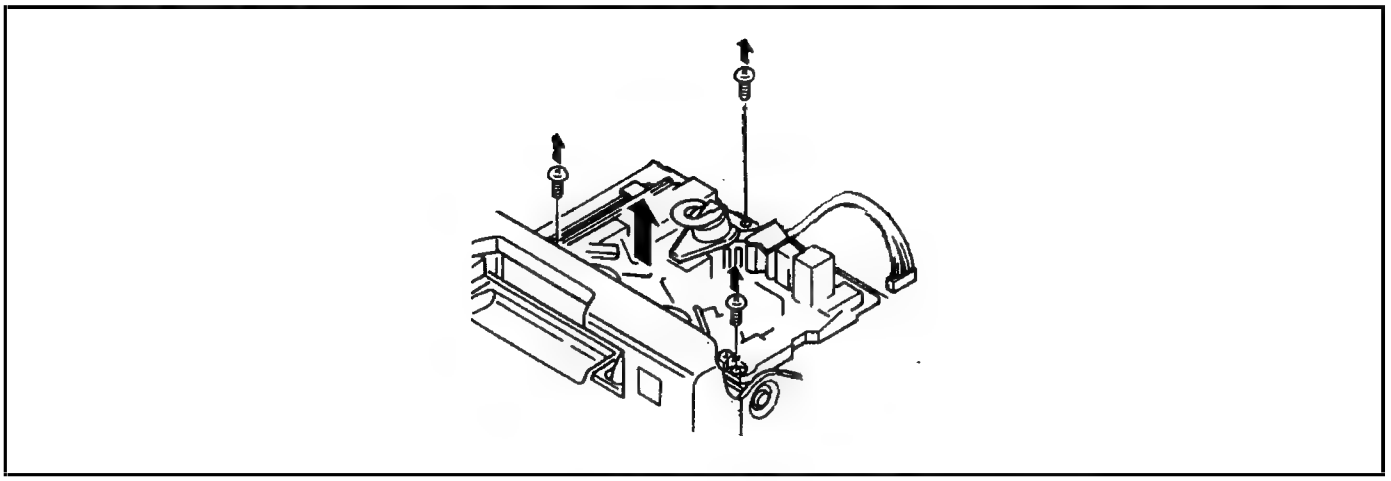


Figure 11

2-10. Removal of LCD Monitor Unit

1. Remove the Top Case Unit.
2. Disconnect the connector (A): CN4 on the LCD P.C.Board as shown in Figure 11.
3. Unscrew the screw and remove the LCD Fixed Plate, then remove the LCD Monitor Unit as shown in Figure 11.

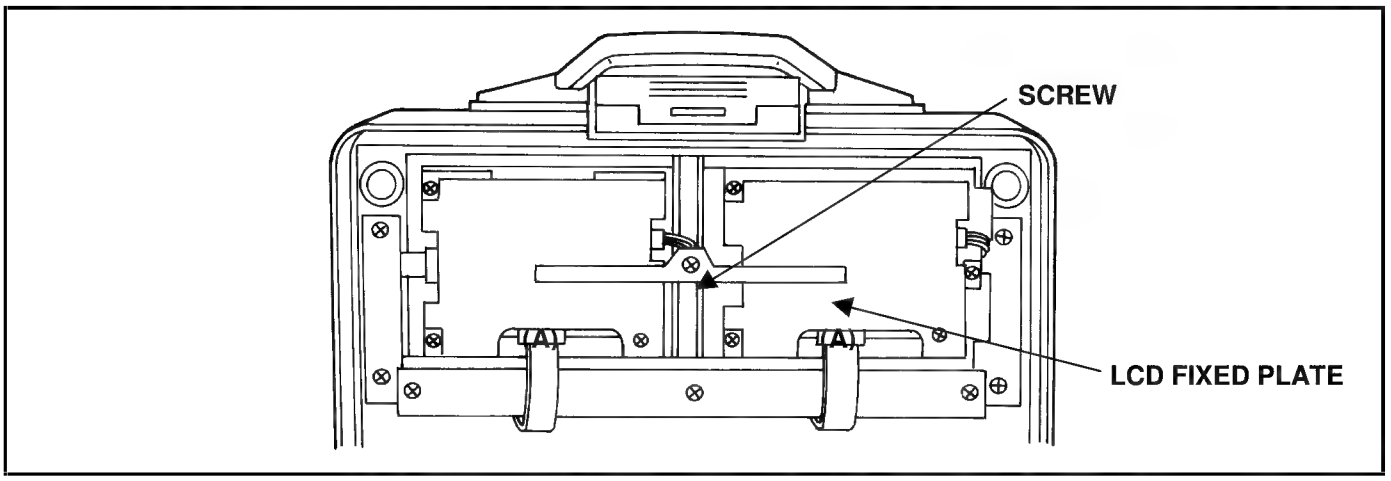


Figure 12

2-11. Removal of Rear Panel Unit

1. Unscrew the 4 screws (A) as shown in Figure 13 and disconnect the connector (A): P4004, (B): P4005, (C): P4006, (D): P4007, (E): P4012,(F): P4011, (G): P4010 and (H): P4008 on the Rear Jack P.C.Board as shown in Figure 14.
2. Disconnect the Connector (I): P1201 on the DC CONV 2 P.C.Board, then remove the Rear Panel Unit as shown in Figure 14.

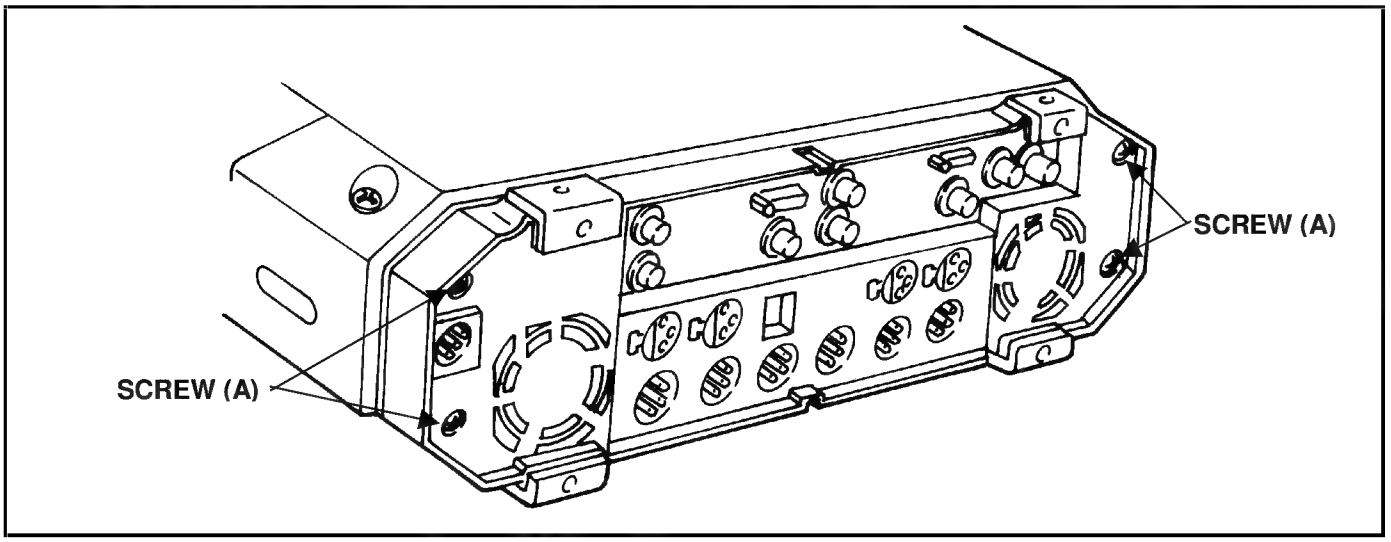


Figure 13

2-12. Removal of Fan Motor

1. Remove the Rear Panel Unit.
2. Unscrew the 6 screws (A) and (B), then remove the Fan Motor Fixed Plate as shown in Figure 14.
3. Disconnect the connector P4002 and P4003 on the Rear Jack P.C.Board, then remove the Fan Motor as shown in Figure 14.

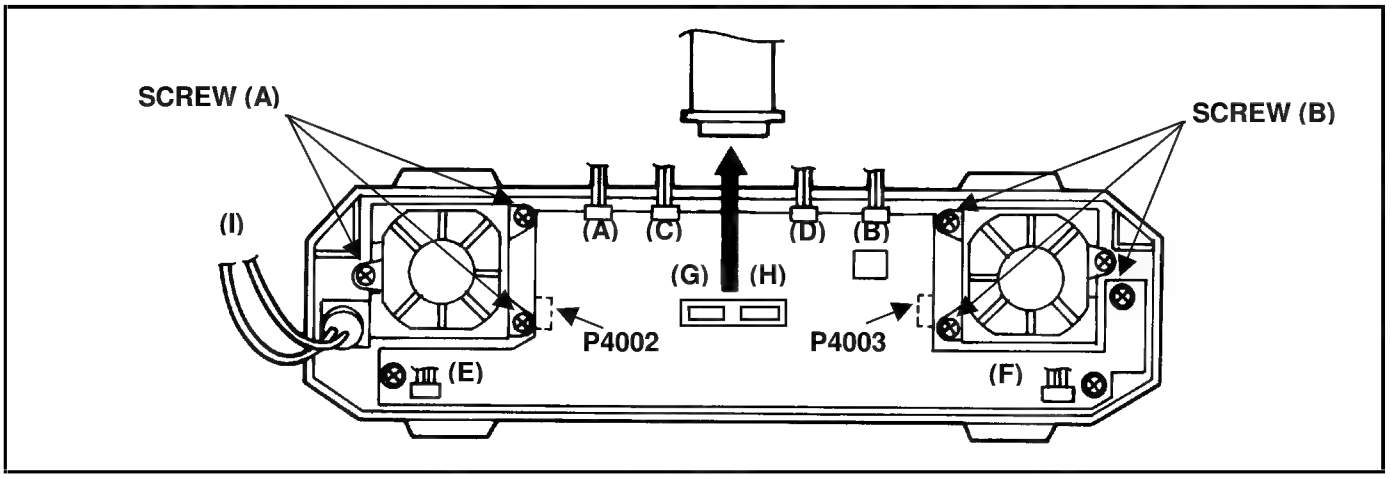


Figure 14

2-13. Removal of Digital 1 and 2 P.C.Board

1. Remove the Bottom Case Unit.
2. Disconnect the connector (A): P35704 on the Digital 1 P.C.Board and connector (B): P33004 on the Digital 2 P.C.Board as shown in Figure 15.
3. Disconnect the connector (C): P35706 on the Digital 1 P.C.Board and connector (D): P33006 on the Digital 2 P.C.Board as shown in Figure 15.
4. Remove the flexible cable, which is connected between connector (E): P35705 and (F): P33005 as shown in Figure 15.

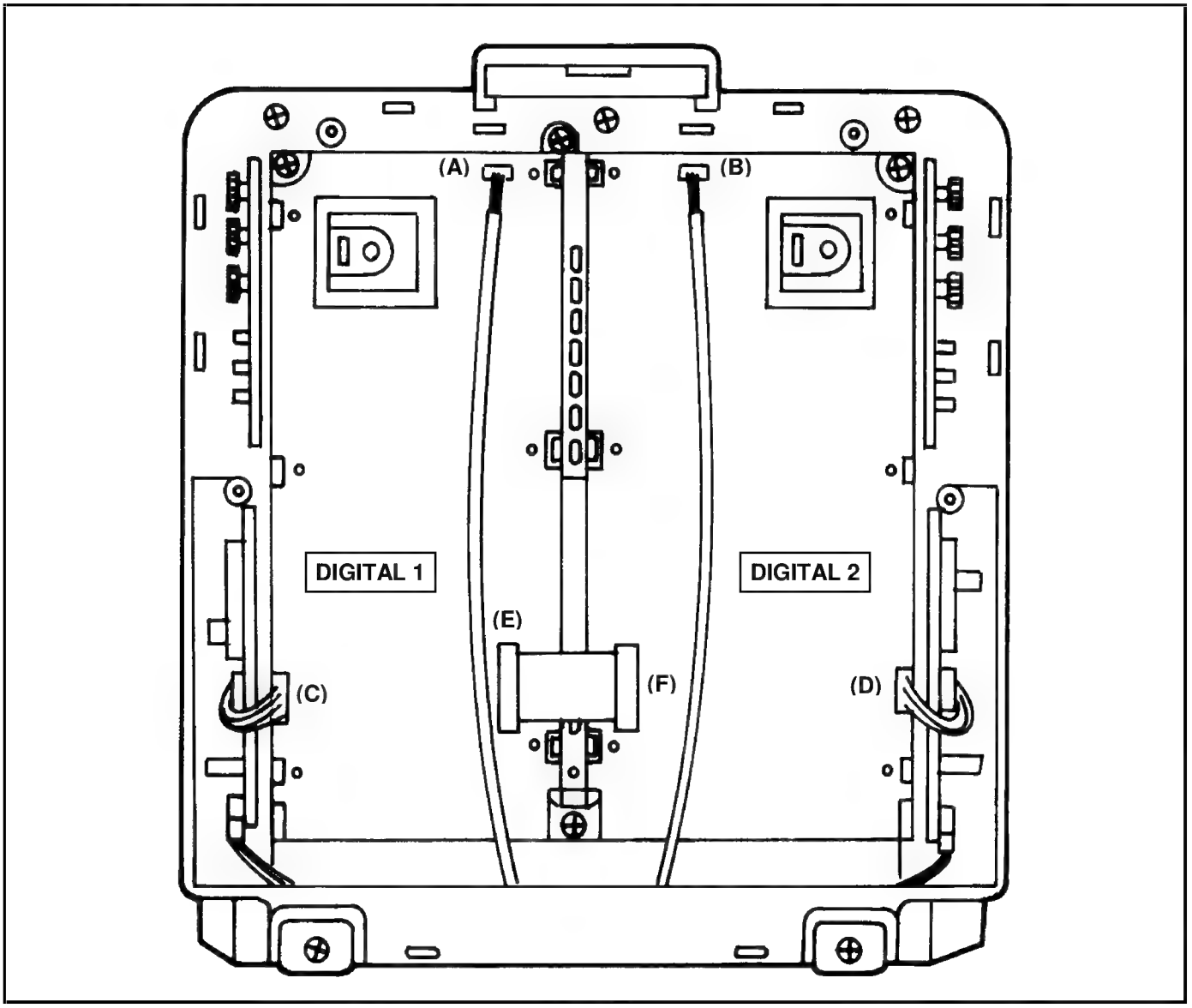


Figure 15

5. Open the Digital 1 and 2 P.C.Board as shown in Figure 16.
6. Disconnect the connector (A): P35702 and (B): P35701 on the Digital 1 P.C.Board as shown in Figure 16, then remove the Digital 1 P.C.Board.
7. Disconnect the connector (C): P33002 and (D): P33001 on the Digital 2 P.C.Board as shown as shown in Figure 16, then remove the Digital 2 P.C.Board.

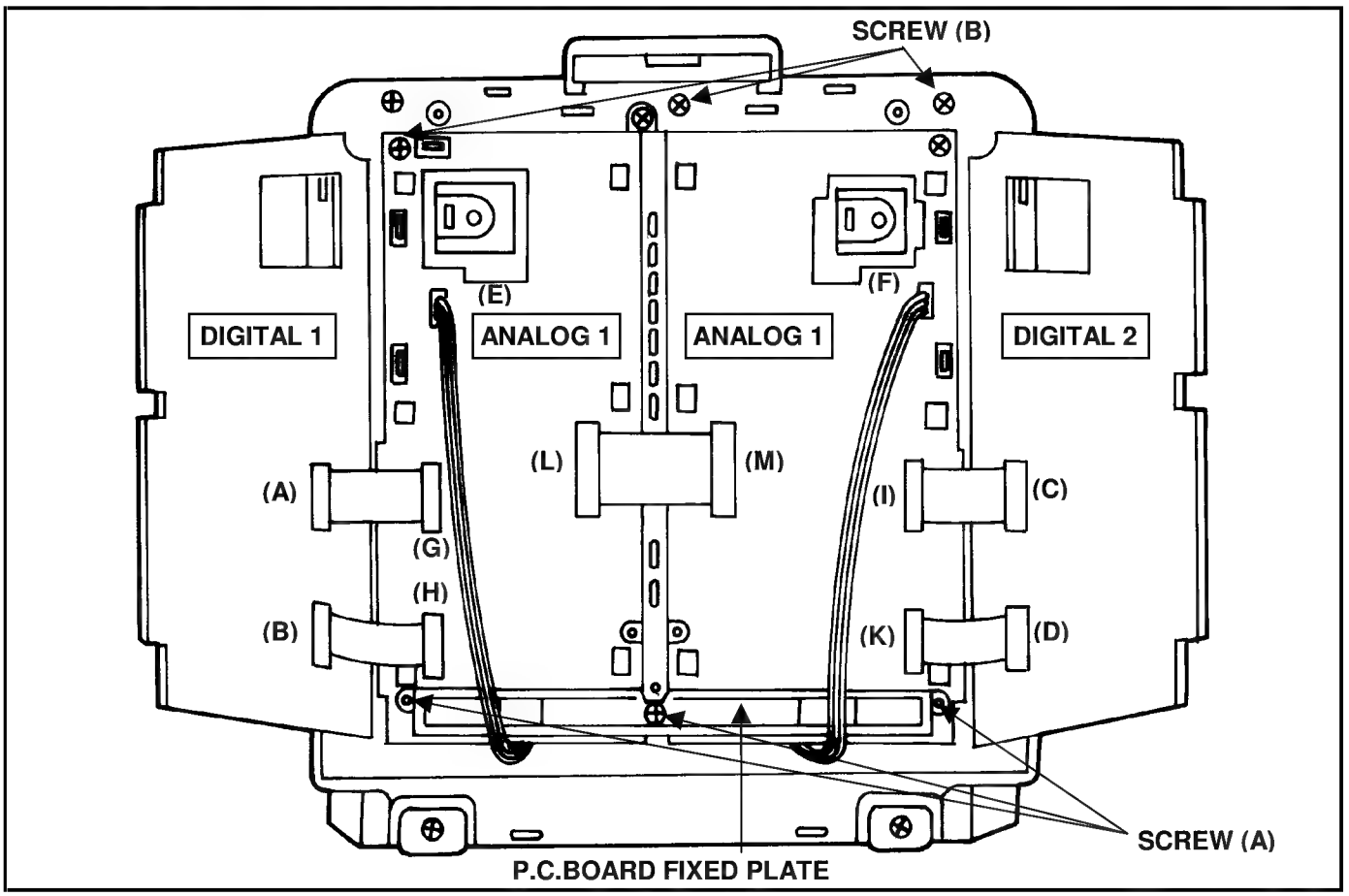


Figure 16

2-14. Removal of Analog 1 and 2 P.C.Board

1. Remove the Bottom Case Unit.
2. Remove the Digital 1 and 2 P.C.Board.
3. Disconnect the connector (E): P7809 on the Digital 1 P.C.Board and (F): P7810 on the Digital 2 P.C.Board as shown in Figure 16.
4. Unscrew the 3 screws (A) and remove the P.C.Board Fixed Plate as shown in Figure 16.
5. Disconnect the connector (G): P7803 and (H): P7805 on the Analog 1 P.C.Board as shown in Figure 16.
6. Disconnect the connector (I): P7803 and (K): P7805 on the Analog 2 P.C.Board as shown in Figure 16.
7. Remove the Flexible Cable, which is connected between connector (L): P7804 and (M): P7804 as shown in Figure 16.
8. Disconnect the connector (A): P7802, (B): P7801 and (C): P7812 on the Analog 1 P.C.Board as shown in Figure 17.
9. Disconnect the connector (D): P7801, (E): P7811 and (F): P7802 on the Analog 2 P.C.Board as shown in Figure 17.
10. Unscrew the 3 screws (B) as shown in Figure 16.

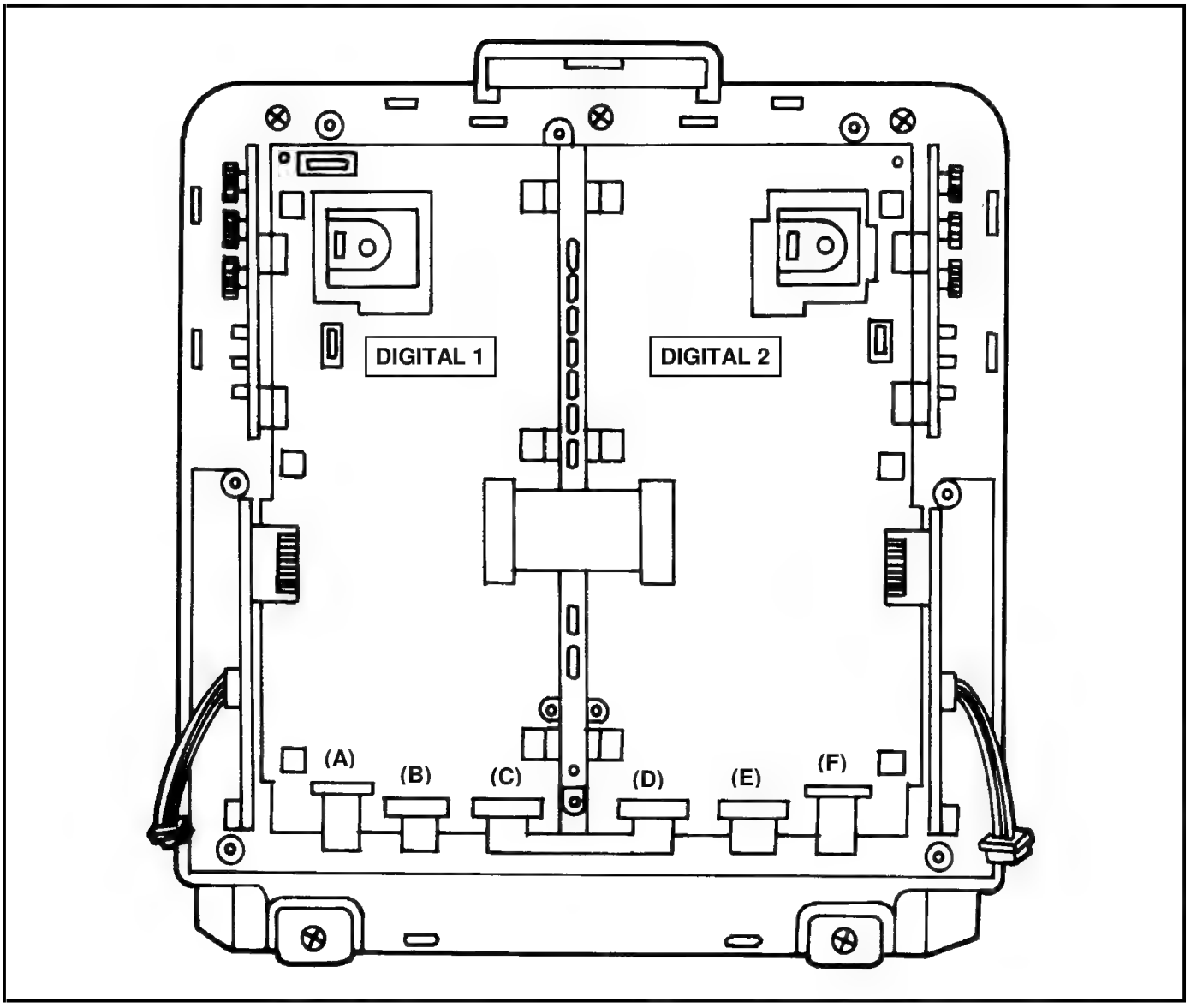


Figure 17

11. Unscrew the 2 screws (A) and disconnect the 2 connectors, then remove the Encoder VR L P.C.Board from Analog 1 P.C.Board as shown in Figure 18.
12. Unscrew the 2 screws (B) and remove the Encoder VR R P.C.Board from Analog 2 P.C.Board as shown in Figure 18.
13. Disconnect the connector P1001, P1002 and P1003 on the DD-Conv. 1 P.C.Board.
14. Unscrew the 2 screws (C) and disconnect the connector P1004 on the DD-Conv 1 P.C.Board as shown in Figure 18, then remove the DD-Conv 1 P.C.Board from Analog 1 P.C.Board.
15. Disconnect the connector P1201, P1202, P1203 and P1204 on the DD-Conv 2 P.C.Board.
16. Unscrew the 2 screws (D) and disconnect the connector P1206 on the DD-Conv 2 P.C.Board as shown in Figure 18, then remove the DD-Conv 2 P.C.Board from Analog 2 P.C.Board.
17. Unscrew the 4 screws (E) and 2 screws (F) as shown in Figure 18, then remove the Analog 1 and 2 P.C.Board.

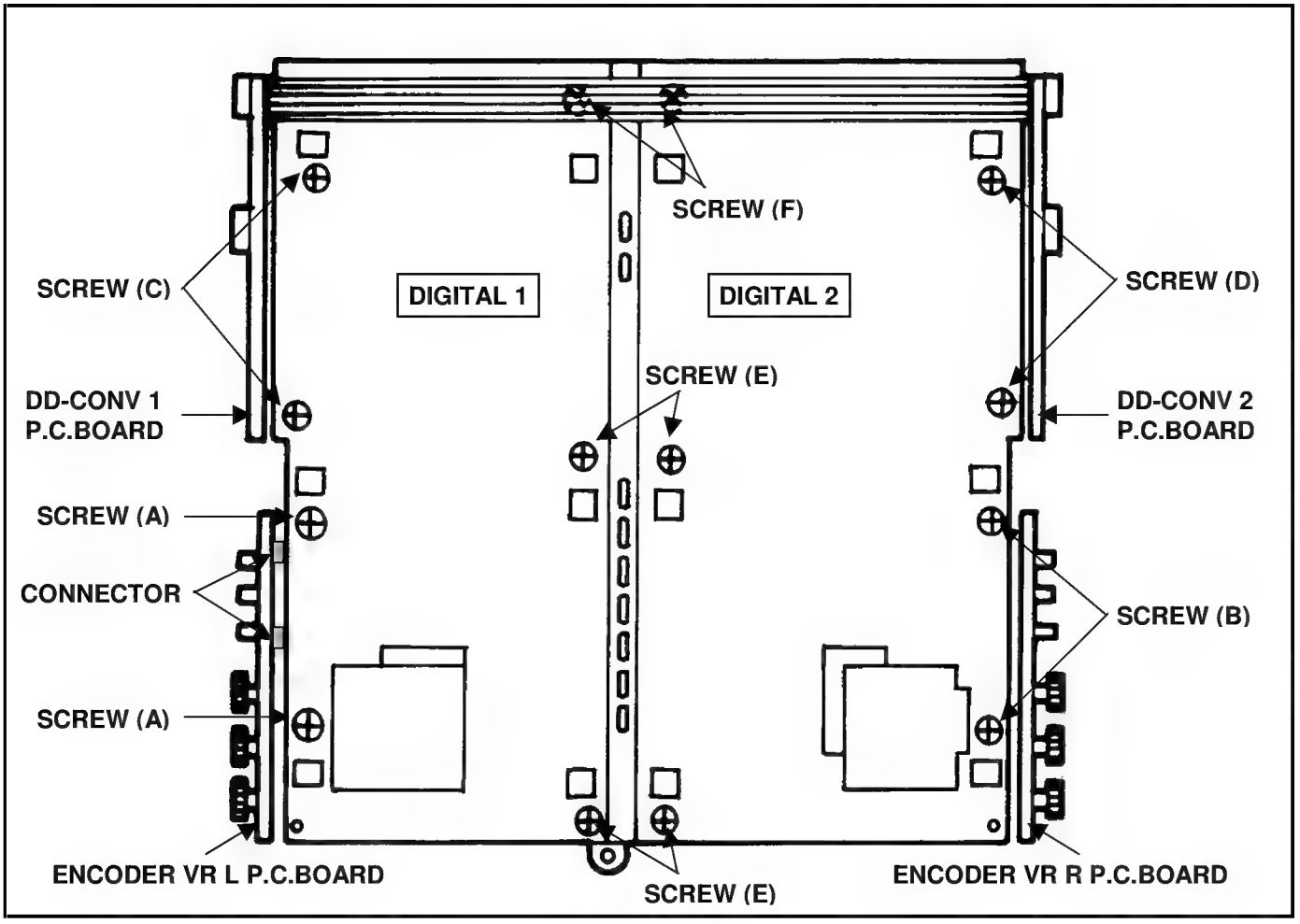


Figure 18

3. Manual Tape Eject

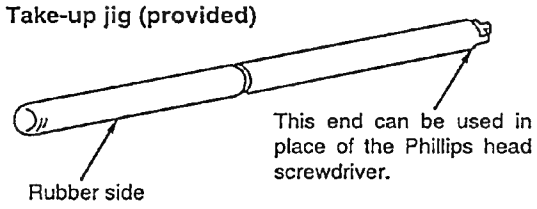
When a tape can not be ejected, because of Power failure or mechanical tape damage, remove the tape manually.

1. Turns power off and remove the top Case Unit.
2. Rotate the red plastic screw by a Phillips - head screwdriver counterclockwise pushing the screw. It needs to rotate about 30 times rotation until starting to move.
3. Since tape slack will develop when the post is unloaded, wind up the supply reel to take up the slack.

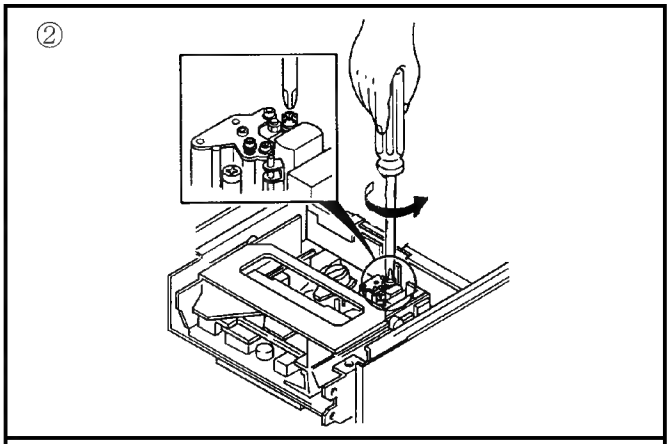
   How to take up the slack (see ③)

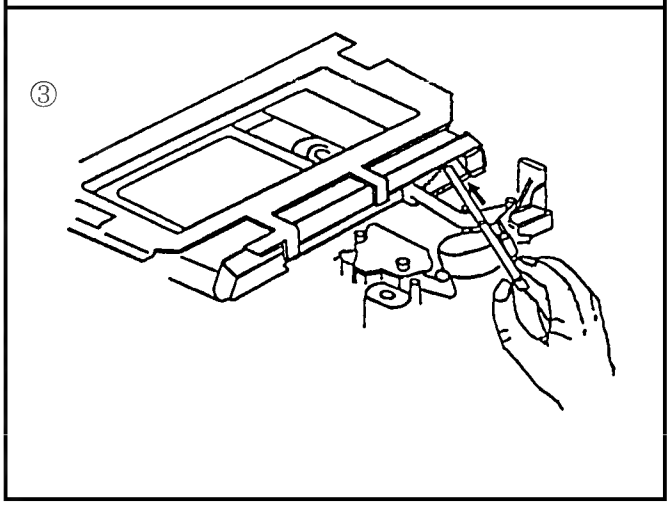
   a. Insert the rubber side of the take-up jig into the cassette tape withdrawal opening on the VTR's mechanism side.

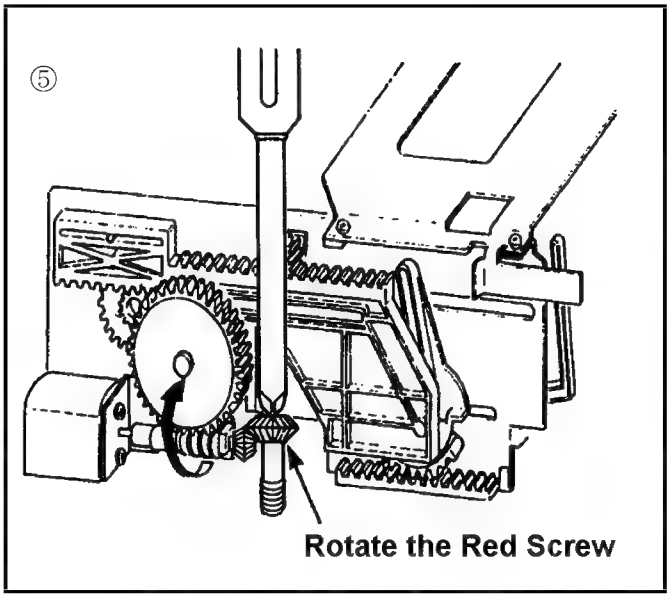
   b. Turn the flange part of the supply reel in the direction of take-up to take up the tape slack. (Take care not to damage the tape in the process.)



4. Repeat item 2 and 3 until the tape in wound Completely inside of the cassette.
5. When the tape is completely inside of the cassette, rotate the red screw in front of the worm gear of the cassette down motor clockwise by a Philips-head screwdriver pusing the screw and remove the cassette cover does not bite the tape when the cover is closed.







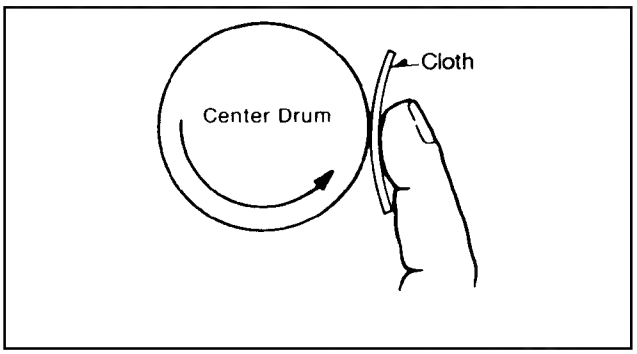
4. Cleaning Procedures

Note: Turns power off during cleaning.

Make sure the power is OFF before cleaning. Use ethanol(more than 99% purity) as cleaning liquid.

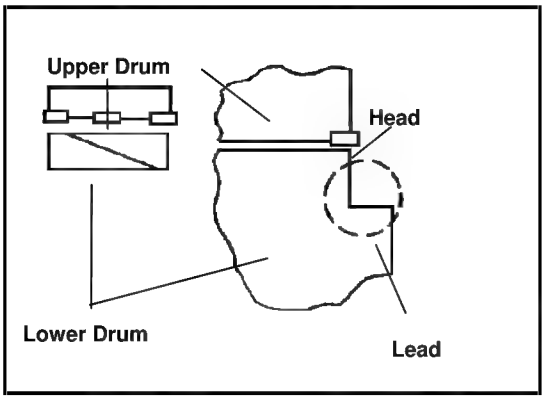
4-1 Cleaning of Head Chips: (Daily)

Clean heads by applying even pressure and rotating cylinder a few times. Never wipe in up and down motion. Never touch a cylinder by naked hand. First wipe with a cloth soaked by cleaning liquid. Then wipe with dry cloth.



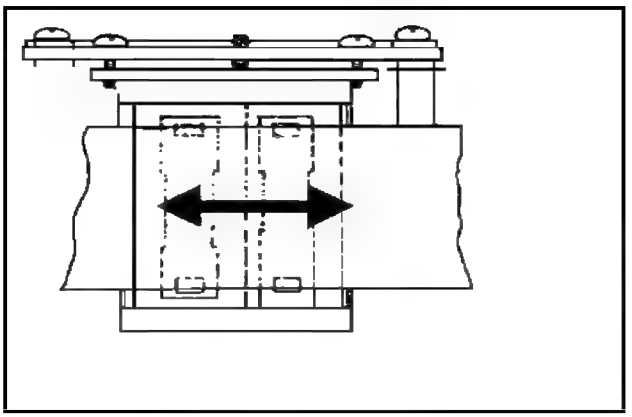
4-2. Cleaning of Drum Lead: (Weekly)

Be careful not to touch a head chip. Clean the drum lead with a pick.



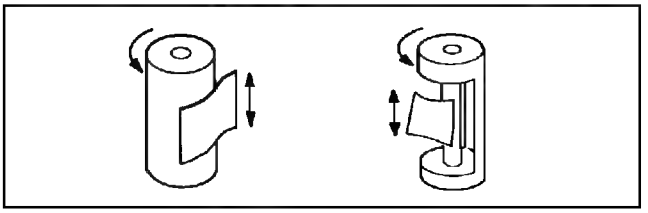
4-3. Cleaning of A/C Head: (Weekly)

Wipe the A/C head with a cloth soaked by cleaning liquid. Wipe again with a dry cloth.



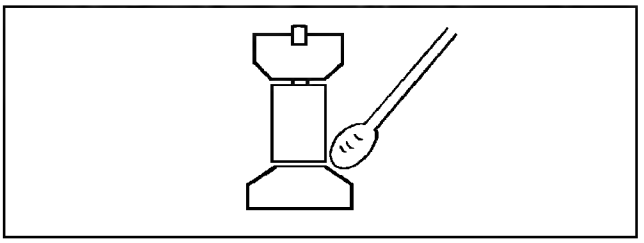
4-4. Cleaning of Pinch Roller and Capstan: (Weekly)

Wipe the Pinch Roller and Capstan with a cloth soaked by cleaning liquid.



4-5. Cleaning of Post :(Weekly)

Wind a cloth on a pick. Wipe each post dry with that pick . Wipe again with a dry cloth. For metal posts wipe with cleaning liquid. Then wipe dry again.



Note:

Use the clean cloth for cleaning purpose. Do not use any dirty cloth.

The Cleaning Cloth can be ordered as spare part. The part number indicated as below.

CLEANING CLOTH : VZZ0095

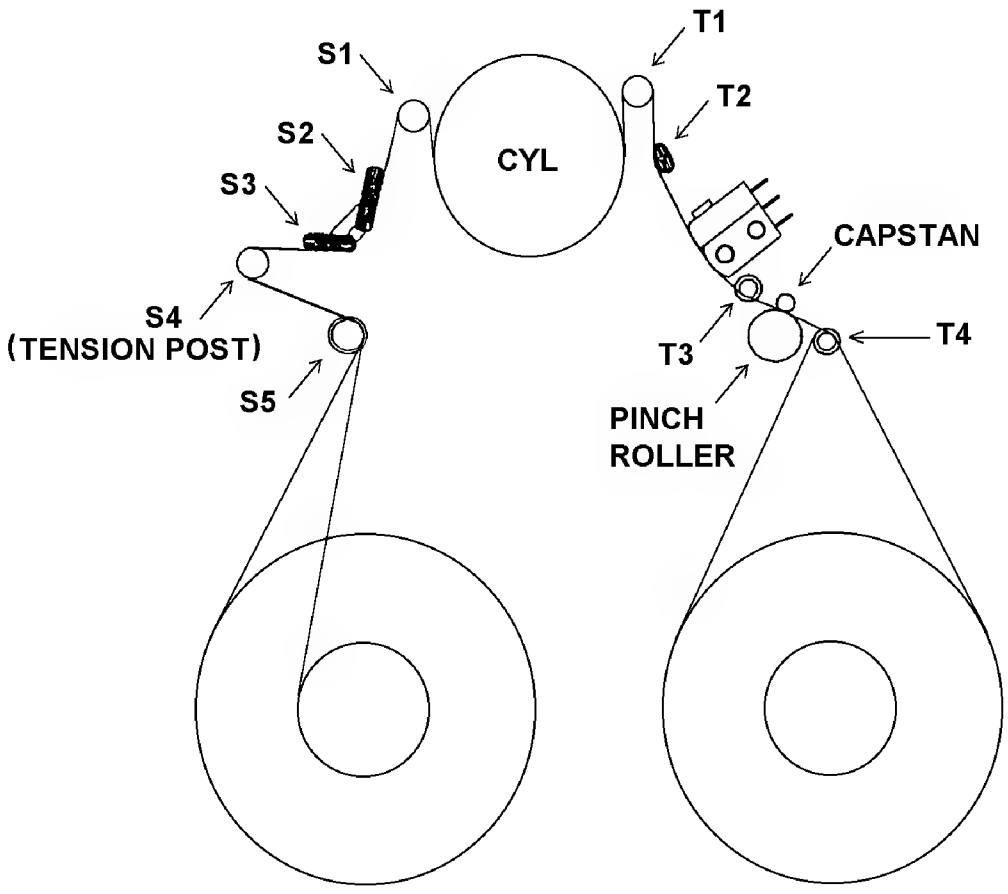
5. Mechanism Adjustment

Note: **Please be careful the Test Point and volume on the Digital 1 P.C.Board, as indicated as below table, reference number is difference between P.C.Board and Schematic Diagram.**

(Digital 1 P.C.Board)

	P.C.BOARD	SCHEMATIC
Tension Voltage	TP2701	TP35701
CTL	TP2705	TP35705
ATF Error	TP2706	TP35706
LISTA GND	TG2708	TG35708
Tension Gain VR	VR2701	VR35701

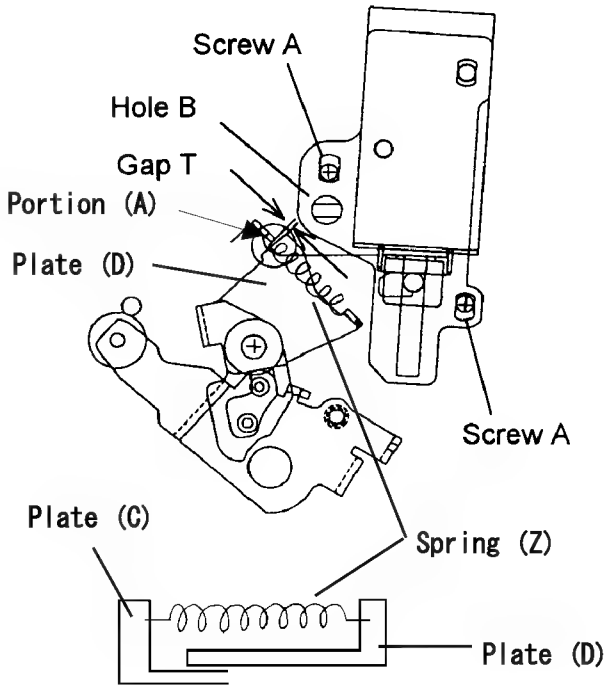
5-1. Name of tape transportation

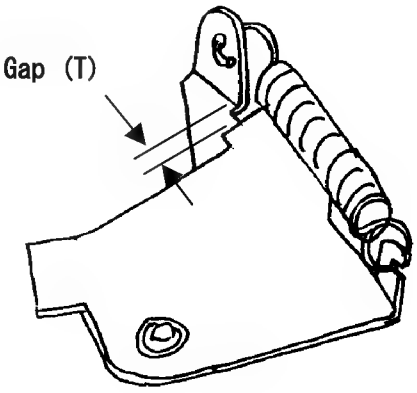


5-2.Pinch Solenoid Position Adjustment

SPEC.	T = 0.3mm
TEST POINT	Gap T
ADJUSTME	Screw(A), Hole(B)
MODE	EJECT (Power OFF)
TOOL	VFK0357(Eccentric Driver)

1. Confirm the power of condition at VTR.
2. Push the pinch roller by hand to be close to capstan.
3. Push the pinch solenoid by hand so that the pinch roller contacts capstan.
4. Loosen the two screws (A) and adjust the hole (B) by VFK0357 so that gap (T) is within specification.
5. The position for confirm Gap, which is located spring scratch to Plate (C) side.

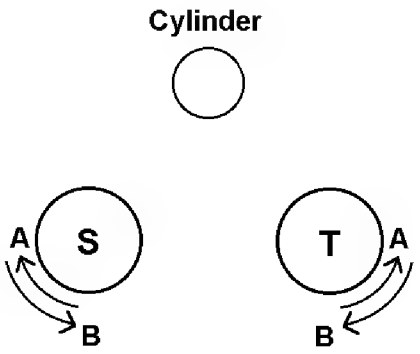




5-3. Main Brake Torque Confirmation

SPEC	Direction A : more than 80g Direction B : more than 15g
TEST POINT	S reel、T Reel
MODE	EJECT（POWER OFF）
TOOL	VFK71(150g)、VFK1191(45g)、VFK1152

1. Remove the Cassette Up Unit.
2. Install the adapter(VFK1152) to the torque gauge (VFK71).
3. Put the torque gauge on S Reel and Turn the torque gauge to direction A until S Reel slips against brake.
4. Confirm the torque is within specification.
5. Put the torque gauge on T Reel and turn the torque gauge to direction A until T Reel slips against brake.
6. Confirm the torque is within specification
7. Install the adapter(VFK1152) to the torque gauge (VFK1191).
8. Put the torque gauge on S Reel and turn the torque gauge to direction B until S Reel slips against brake.
9. Confirm the torque is within specification.
10. Put the torque gauge on T Reel and turn the torque gauge to direction B until T Reel slips against brake.
11. Confirm the torque is within specification.



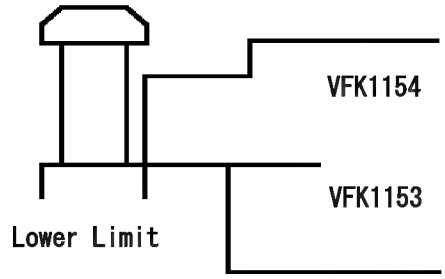
5-4. Post Height Pre-adjustment

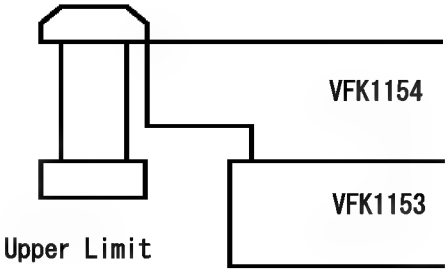
MODE	EJECT（POWER OFF）
TOOL	VFK1153, VFK1154（Flange Tool）

1. Turn the power OFF and then set the tube* to cover the sensor LED and place the unit in no tape loading mode.
   NOTE: Make a tube* by yourself.
2. Install the Mech. Neutral Plate (VFK1153) and adjust each post height as shown in figure.
3. Adjust the each post to Lower limit by VFK1154 as shown in figure.
4. VFK1149 use for Post height adjustment of S4 and S5 post. VFK1151 use for Post height adjustment of T3 and T4 post.

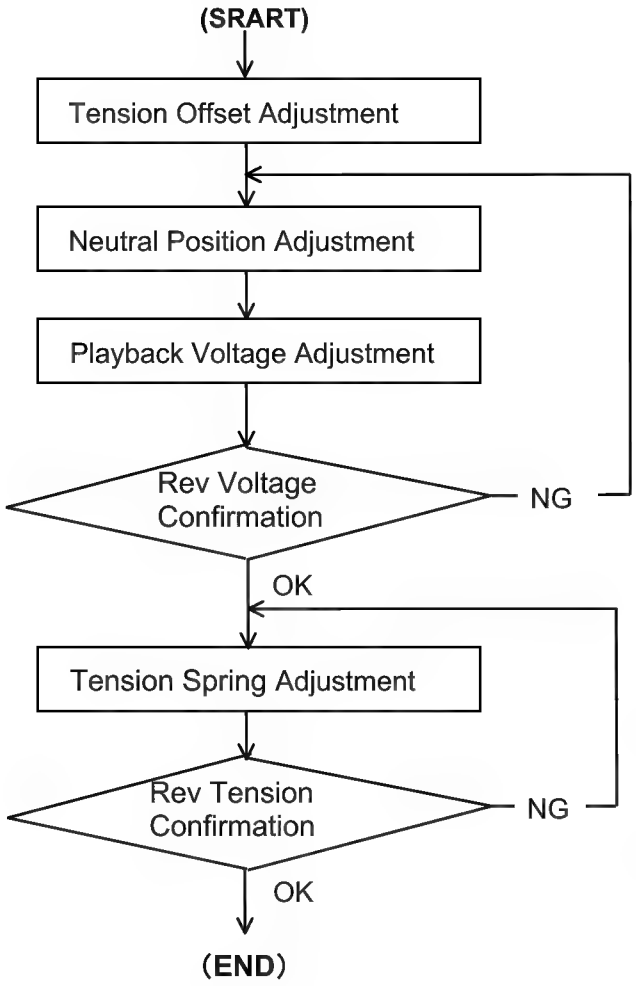
Post	Limit	Post Driver
S5 Post	Lower*	VFK1149
S4 Post	Lower*	VFK1149
T3 Post	Lower	VFK1151(2.5mm Nut Driver)
T4 Post	Lower	VFK1151(2.5mm Nut Driver)

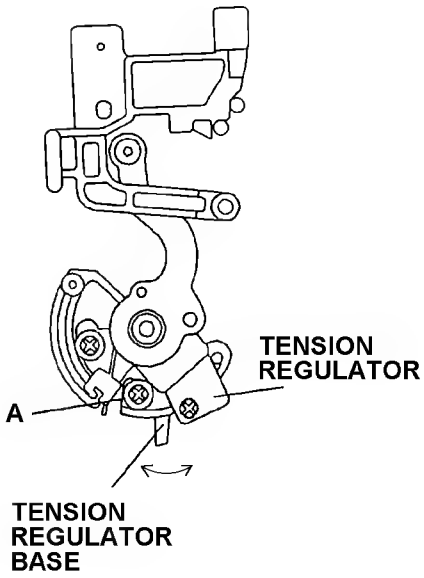
Note: Lower* : Turn S4 and S5 posts 1 round more counterclockwise from lower limit position.





5-5. Tension Adjustment Flowchart





5-6. Tension Offset Adjustment

BOARD	Digital 1 or 2		
SPEC	2.5±0.05V		
MODE	EJECT		
TOOL	Digital Volt Meter		
TEST POINT	VTR1(Digital 1)		VTR2(Digital 2)
	P.C.Board	Schematic	TP33001
	TP2701	TP35701	
ADJ.	A05:Tension OFST		A05:Tension OFST

1. Adjust the EVR on the Servo Adjust menu so that the DC voltage at Test point is within specification.

5-7. Tension Arm Neutral Position Adjustment

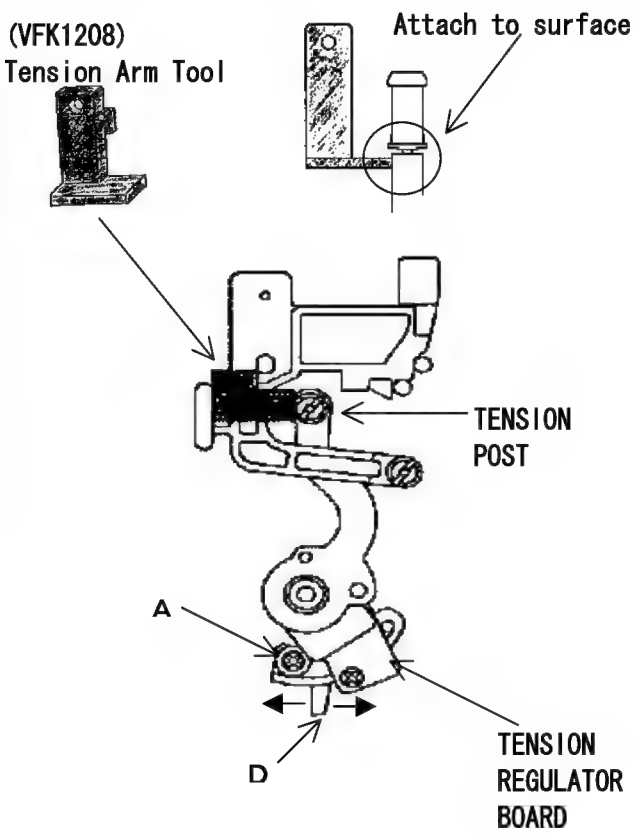
BOARD	Digital 1 or 2		
SPEC	2.5±0.1V		
MODE	STOP		
TOOL	Digital Volt Meter VFK1208 (Black、with hole)		
ADJ.	Base position of Tension Regulator Board		
TEST POINT	VTR1(Digital 1)		VTR2(Digital 2)
	P.C.Board	Schematic	TP33001
	TP2701	TP35701	

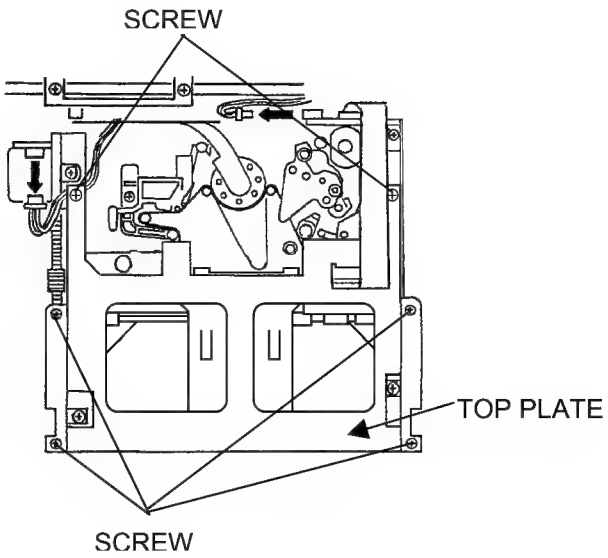
1. Unscrew the 6 screws and remove the Top Plate on the Front Loading Unit.
2. Install the VFK1208(black with hole) as shown in figure
3. Connect the Digital Volt Meter to Test point.
4. Place the unit into the no tape loading mode(Refer to No tape loading mode procedure as mentioned as below.
5. Loosen the screw (A) and move the lever (D) with tweezers for adjust the sensor position so that the DC voltage at Test point is within specification.

[No tape loading procedures]

Open the SERVO ADJUST menu on the Service Menu. Select the "T REEL TRQ" by JOG dial and press SHIFT key, then loading is started. During adjustment, hold the SHIFT key.

CAUTION: 1. Do not use magnetized tweezers and Screw driver.
2. Do not touch the magnetize Screw driver to S-Reel FG magnet portion, when the lever (D) portion is adjusting.

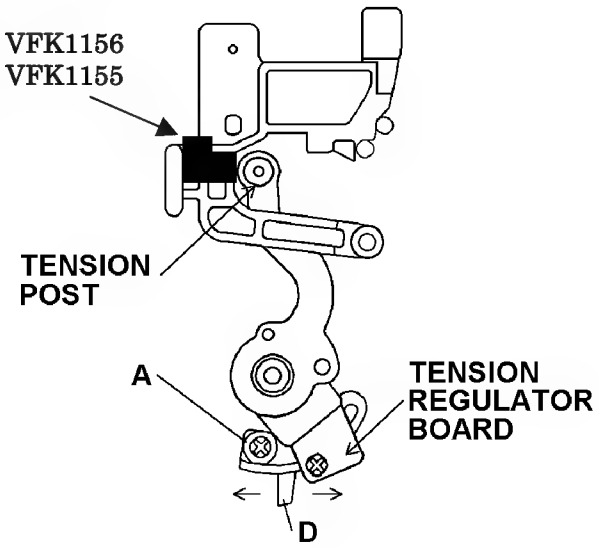




5-8. Tension Arm PLAY and REV voltage adjustment

BOARD	Digital 1 or 2		
SPEC	(PLAY) 3.8±0.05V (REV) 1.2±0.3V		
TOOL	Digital Volt Meter VFK1156(Black: for PLAY position) VFK1155(Silver: for REV position)		
MODE	STOP		
TEST POINT	VTR1(Digital 1)		VTR2(Digital 2)
	P.C.Board	Schematic	TP33001
	TP2701	TP35701	
ADJ.	VR2701	VR35701	VR3001(Digital 2)

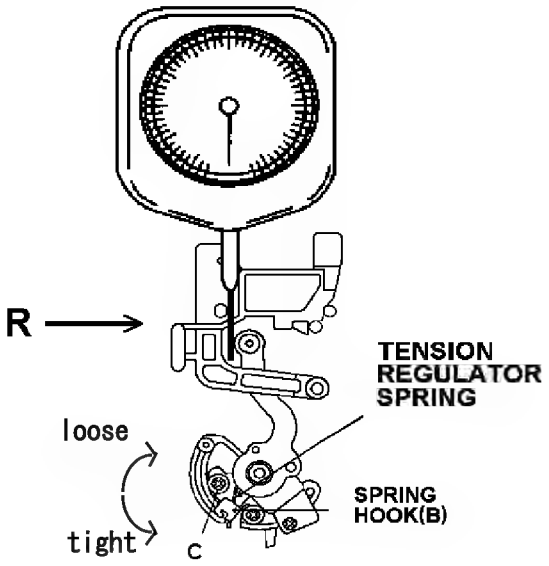
1. Install the VFK1156(black) as shown in figure.
2. Connect the Digital Volt Meter to Test point.
3. Place the unit into no tape loading mode
4. Adjust the VR so that the DC voltage at Test point is within specification (PLAY).
5. Install the VFK1155(Silver) as shown in figure and confirm that the DC voltage at Test point is within specification (REV).
6. If it out of spec, perform the Neutral Position adjustment again.



5-9. Tension Regulator Spring Adjustment

BOARD	Digital 1 or 2		
SPEC	11±1gf		
ADJ.	Tension Regulator Spring hook (B)		
MODE	STOP		
TOOL	Digital Volt Meter VFK1188(30g Dial Tension Gauge)		
TEST POINT	VTR1(Digital 1)		VTR2(Digital 2)
	P.C.Board	Schematic	TP33001
	TP2701	TP35701	

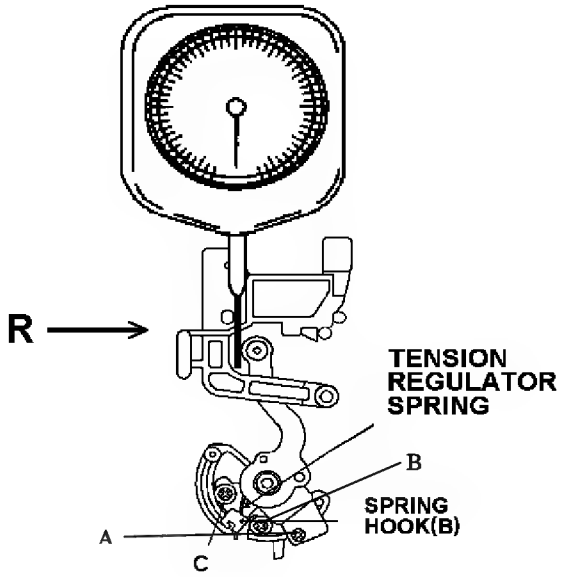
1. Connect the Digital Volt Meter to Test point.
2. Place the VTR into no tape loading mode.
3. Insert the tension gauge to push the tension post to the direction R until the voltage at the Test point is 3.8V (PLAY position)
4. Loosen the screw (C) and adjust the position of hook (B) so that the indication of gauge is within specification.



5-10. REV Tension Confirmation

BOARD	Digital 1 or 2		
SPEC.	18±2gf		
M.EQ	Digital Volt Meter VFK1188(30g Dial Tension Gauge)		
MODE	STOP		
TEST POINT	VTR1(Digital 1)		VTR2(Digital 2)
	P.C.Board	Schematic	TP33005
	TP2701	TP35701	

1. Connect the Digital Volt Meter to Test point.
2. Place the unit into no tape loading mode.
3. Insert the tension gauge to push the tension post to the direction R until the voltage at the Test point is 1.2V (REV position)
4. Confirm that the indication of gauge is within specification. If not, make the Tension Spring Adjustment again.
5. After finish this adjustment , grew the screw A,B and C . The grew quantity at B is half of A and C.

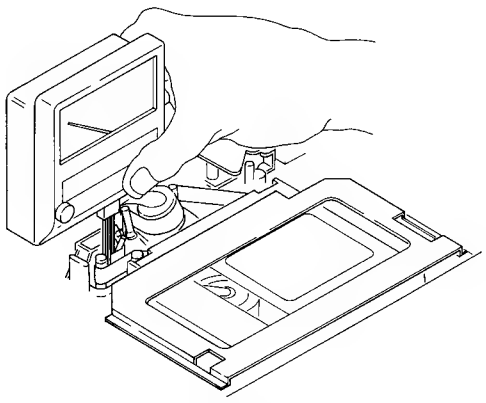


5-11. Tension Confirmation

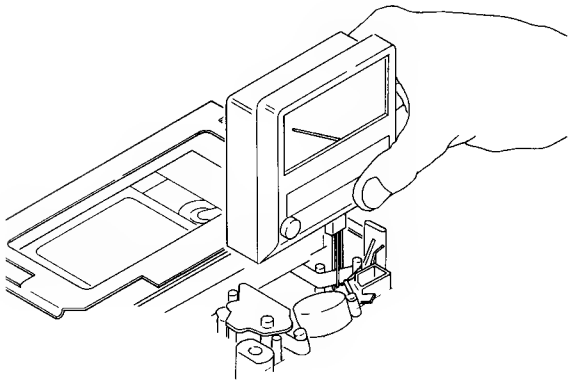
SPEC	(PLAY) 6.0±1gf (REV) 9.0±2gf
MODE	PLAY、REV×1
TAPE	63 min M size Blank Tape
TOOL	VFK1145(Tension Meter)

1. Play back beginning portion of the tape.
2. Insert the tension meter between S3 post and S4 post.(Refer to figure).
3. Confirm the tension is within specification.
4. Place the unit in REV mode.
5. Insert the tension meter between S4 post and S5 post.(Refer to figure)
6. Confirm the tension is within specification.

NOTE: Be careful not to give some tape damage.

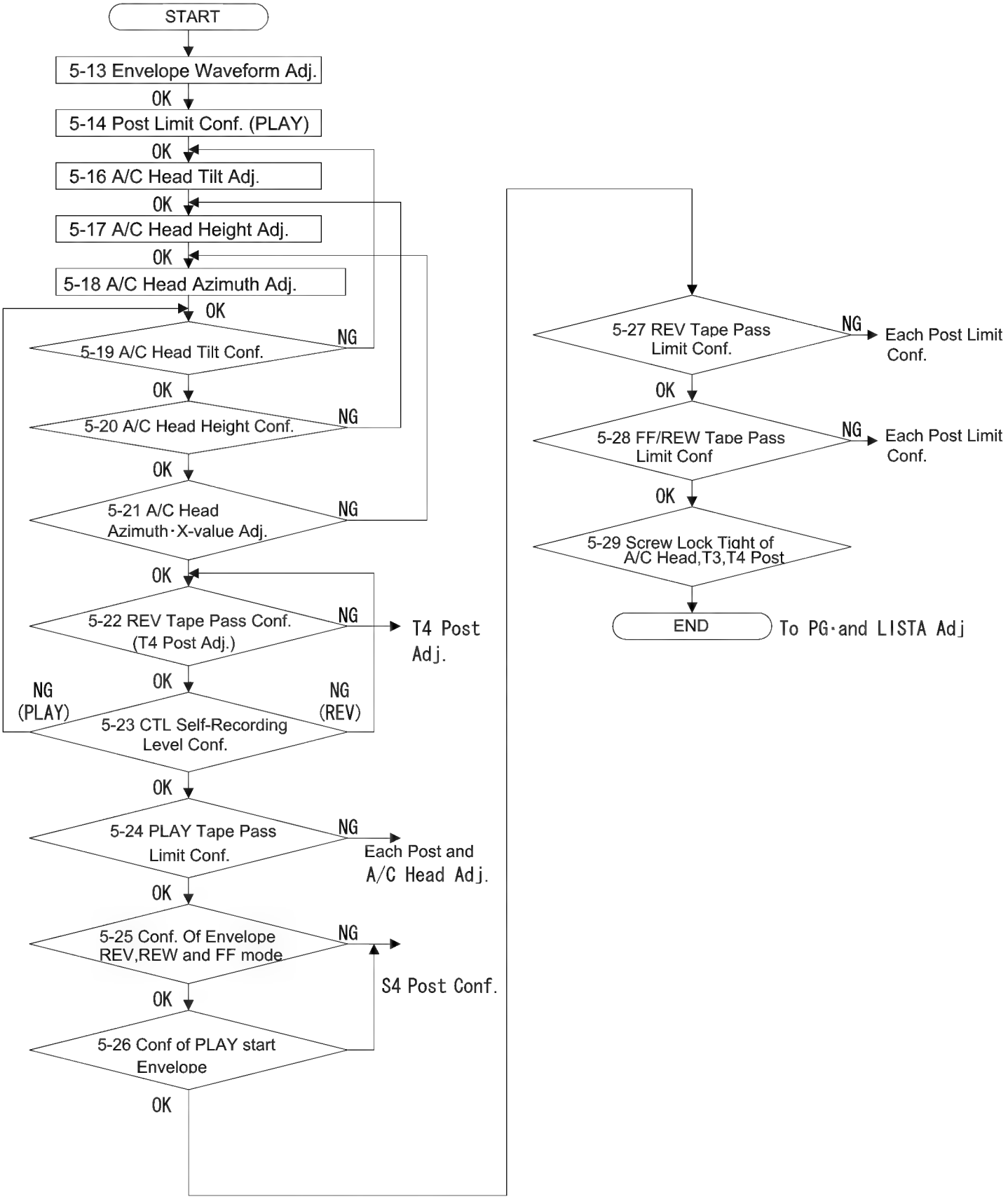


Play Tension



Rev Tension

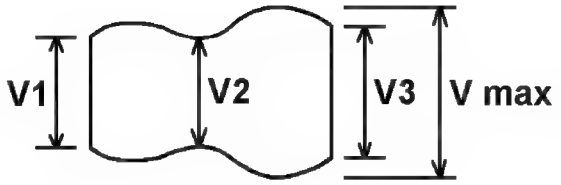
5-12. Tape Pass Adjustment Procedure



5-13. Envelope Waveform Adjustment

SPEC	V1/Vmax、V2/Vmax、V3/Vmax ≧ 0.8
TEST POINT	TP5001:R/P ENV (Digital 1 or 2) TP6001 :TRIG/HSW (Digital 1 or 2)
ADJUSTMENT	S1、T1 Post Height
MODE	PLAY(ATF)
TAPE	**NTSC:** VFM3580KM **PAL:** VFM3680KM
M.EQ	Oscilloscope
TOOL	VFK1149 (Post Driver)

1. Playback the alignment tape.
2. Adjust S1 and T1 post height so that the R/P envelope output is within the specification.
3. When the S1 and T1 posts are adjusted, first raise the post height and make small the entrance and exit side of the envelope, then down the post until envelope becomes flat.
4. With order to adjustment, basically adjust T1 post for makes flat at exit side of envelope first and adjust S1 post.
5. After finish this adjustment, unload the tape and load the tape again, then confirm the shape of Envelope waveform does not changed.

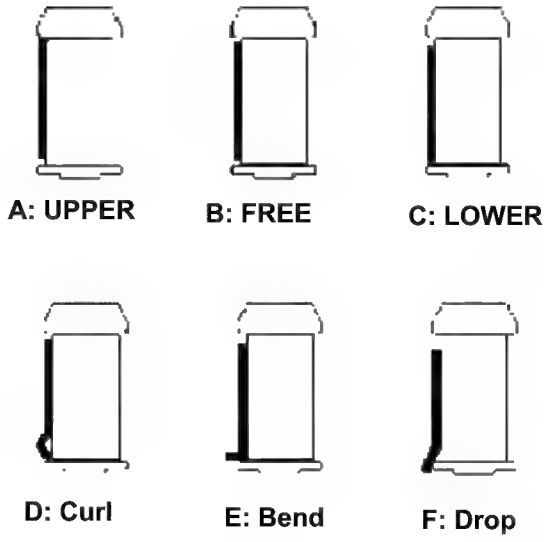


5-14 Post Limit Confirmation (PLAY)

SPEC	Post limit shown in the table No tape curl
MODE	PLAY
TAPE	Blank Tape
TOOL	VFK1149(Post Driver) VFK1151(Nut Driver)

1. Confirm that the tape pass limit follow the as shown as below table and adjust it in case of need.
2. Confirm that the kinds of D、E and F condition do not appeared on the tape as shown in figure.

Post	Limit	Adjustment
S5	Lower limit or Free	S5 Post Height
S4	Lower Limit	S4 Post Height
S1	Upper Limit	Envelope waveform
T1	Upper Limit	Envelope waveform
T3	Lower Limit	T3 Post Height
T4	Lower limit or Free	T4 Post Height

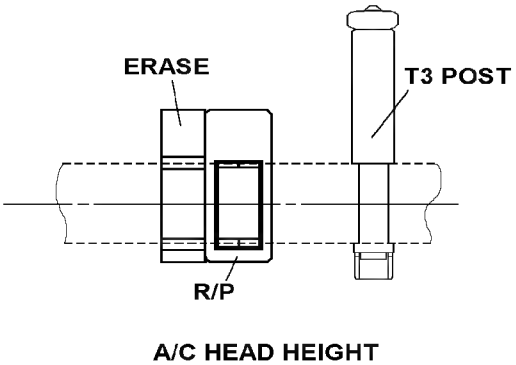


5-15. A/C Head Adjustment Method

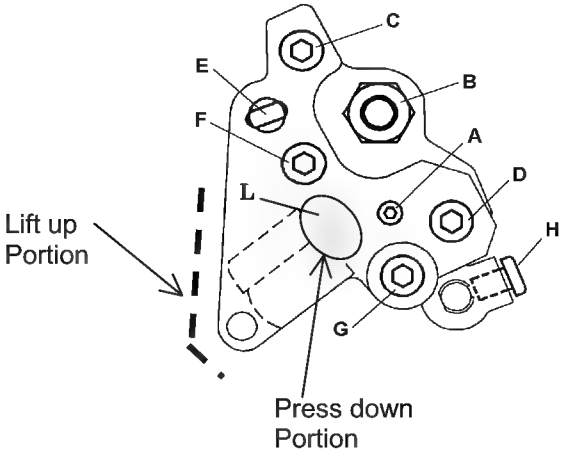
Adjustment Item	SCREW	Adjustment Method	Torque
Tilt adjustment	A	Tighten direction ▪ ▪ ▪ Decrease CUE Loosen direction ▪ ▪ ▪ Increase CUE	
Height adjustment	B	Tighten direction ▪ ▪ In case of increase CTL, when A/C Head Press down. Loosen direction ▪ ▪ In case of increase CTL, when A/C Head lift up.	
Azimuth adjustment	F	Phase is adjusted by screw F	
X-value adjustment	C D	Adjust X-value by VFK0357 at Hole (E), then tighten the screw (C) and (D) to fix A/C Head horizontal position.	2.5Kg.cm
Fixed Tilt and Azimuth	G	Screw (G) is always tighten during adjustment except Tilt and Azimuth.	1.0Kg.cm
Fixed height	H	After height adjustment, tighten the screw (H) to fix height of A/C Head.	

SCREW	Tool for adjustment
A	VFK1178 (0.89mm Hex Driver)
B	VFK1150 (5.5mm Tool for adjustment)
F	VFK1148 (1.5mm Hex Driver)
C,D,G	VFK1209 (Torque Driver) VFK0912 (1.5mm Post Axis Driver)
H	VFK1190 (1.5mm L type of Hex Wrench)

1. Each adjustment of A/C Head should be perform under the screw (G) tightened.
2. Confirm the screw (A) does not loosen, before execute the A/C Head Tilt adjustment. The screw (A) should be always touch to top of A/C Head.
3. Be careful the tape damage at T3 Post, when adjust tilt of A/C Head.
4. When the height of A/C Head is adjusted by Nut (B), first the screw (H) should be loosen. And after height adjustment finished, tighten the screw (H) lightly.
5. Each adjustment of A/C Head should be finished at the condition of turn the each adjustment screw tighten direction. And hit the portion (L) lightly for remove the distortion.
6. Adjust alternately each A/C Head adjustment with Envelope Waveform adjustment.



A/C HEAD HEIGHT



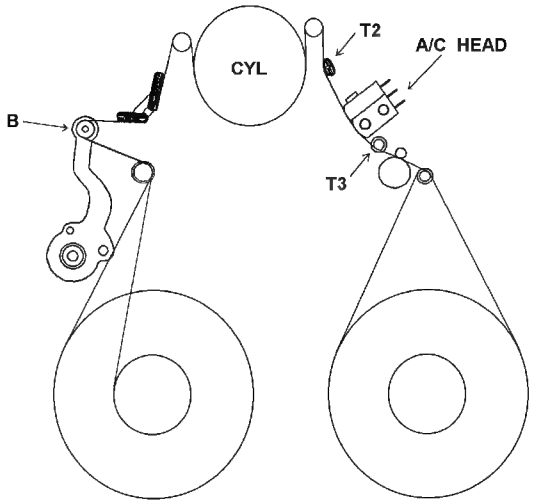
5-16. A/C Head Tilt Adjustment

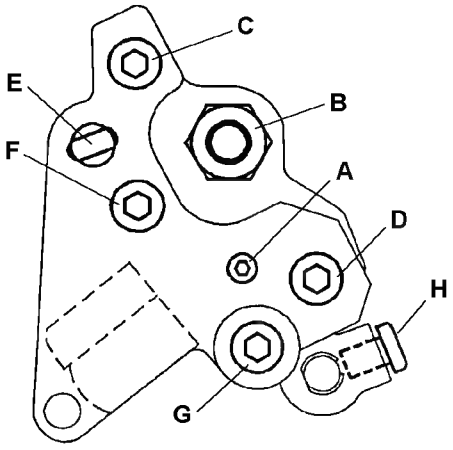
SPEC	Lower limit at T3 Post No tape curl
ADJUSTMENT	SCREW A and G (A/C Head)
MODE	PLAY
TAPE	Blank Tape
M.EQ	VFK1148、VFK1178(Hex Driver)

1. Play back the tape and adjust screw(A) for adjustment of tilt of A/C Head so that the tape path has lower limit without curl at T3 post.
2. To adjustment, loosen the screw (G) and make curl on tape at lower flange of T3 post by screw (A). And tighten screw (A) accordingly for find the point of curl disappeared. After finish adjustment for screw (A), tighten the screw (G) is tightened with 1.0Kg/cm of torque.

(NOTE)

1. In case of turn clockwise screw (A).
   → Tape goes up at T3 post.
   In case of turn counter-clockwise screw (A).
   → Tape goes down at T3 post.
2. When screw adjustment finished, with each adjustment screw on A/C Head should be finished tighten direction. And confirm that the screw does not loosen.
3. Adjust and confirmation should be performed alternately with each A/C head adjustment(Azimuth and Height).





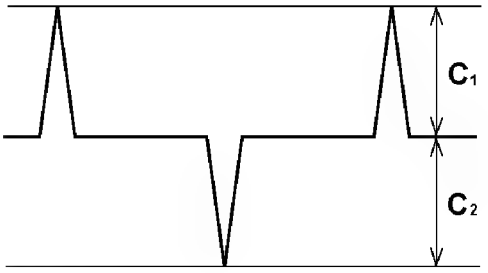
5-17. A/C Head Height adjustment

BOARD	Digital 1 or 2		
SPEC	CTL Output (C1,C2≧160mV)		
ADJ.	SCREW B and H (A/C Head)		
MODE	PLAY		
TAPE	**NTSC:** VFM3580KM (14min to 22min) **PAL:** VFM3680KM (14min to 22min)		
M.EQ	Oscilloscope		
TOOL	VFK1150(Nut Driver) VFK1190(Hex Wrench)		
TEST POINT	VTR1		VTR2
	P.C.Board	Schematic	TP33005
	TP2705	TP35705	

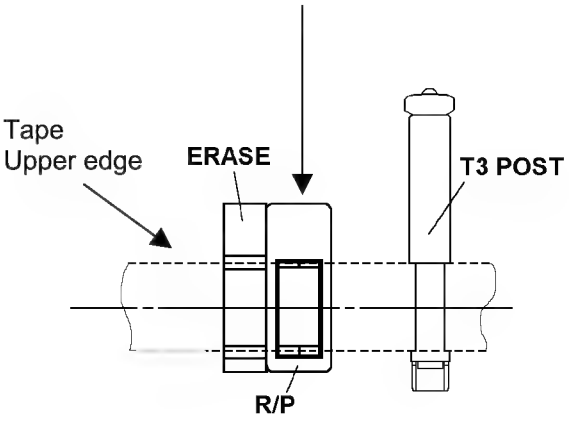
1. Observe the CTL output on the Digital board.
2. Press and Lift up to A/C Head lightly as indicated as figure position, then confirm that the CTL output level is decreased.
3. If increases CTL output, when press the A/C Head. Loosen the screw H and adjust the screw B counterclockwise until CTL output is maximized.
4. If increases CTL output, when lift up the A/C Head. Loosen the screw H and adjust the screw B clockwise until CTL output is maximized.
5. After tightening the screw H(2.0kg), confirm the level again.

< NOTE >

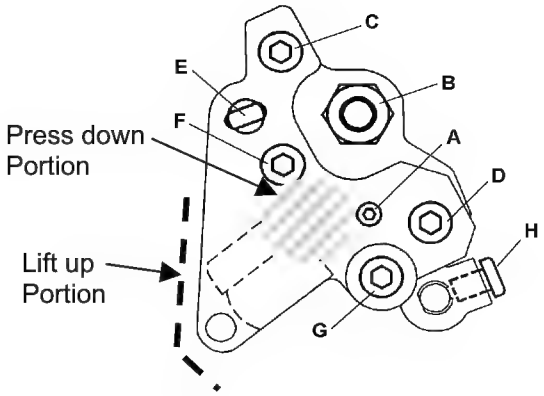
1. Adjust alternately with other A/C head adjustments(Azimuth, Height).



Upper edge of CUE R/P Head
(Upper edge of white portion)



A/C HEAD HEIGHT



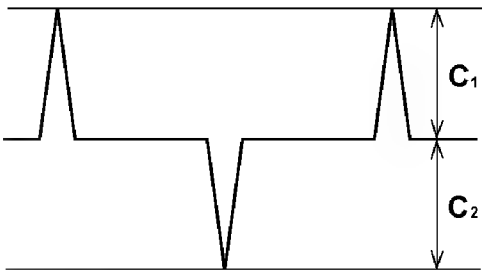
5-18. A/C Head Azimuth Adjustment

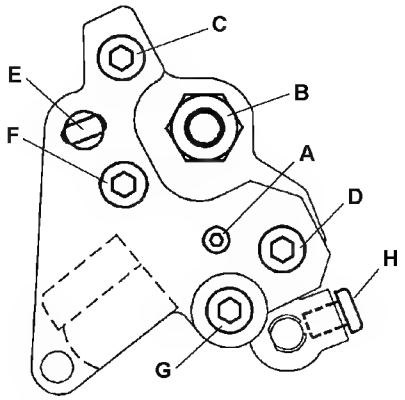
BOARD	Digital 1 or 2		
SPEC	CTL Output:C1,C2 = C1 max、C2 max		
ADJ.	SCREW F (A/C Head)		
MODE	PLAY		
TAPE	**NTSC:** VFM3580KM (14min to 22min) **PAL:** VFM3680KM (14min to 22min)		
M.EQ	Oscilloscope		
TOOL	VFK1148(Hex Driver)		
TEST POINT	VTR1		VTR2
	P.C.Bpard	Schematic	TP33005
	TP2705	TP35705	

1. Observe the CTL output on the Digital Board.
2. To adjustment, loosen the screw (G) and adjust screw (F) so that the CTL output become maximum.
3. Tighten screw (G) with 1.0Kg torque.

< NOTE >

1. Adjust alternately with other A/C head adjustments(Azimuth, Height).

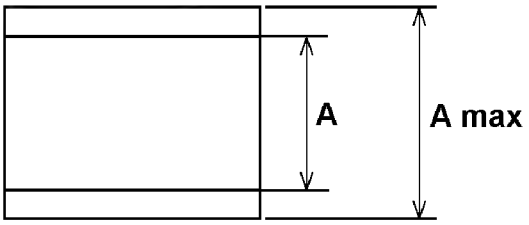


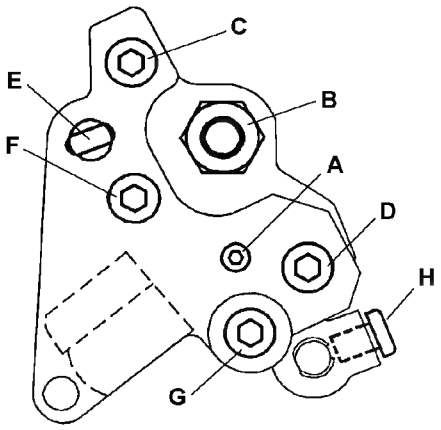


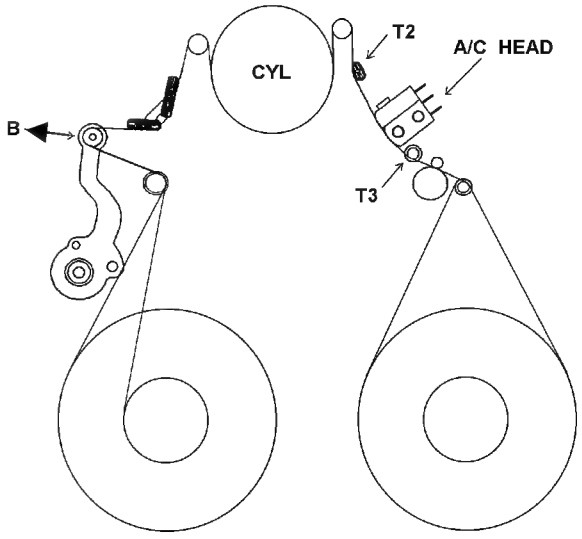
5-19. A/C Head Tilt Confirmation

BOARD	Analog 1 or 2	
SPEC	A/Amax ≧ 0.8	
ADJ.	SCREW A and G (A/C Head)	
MODE	PLAY	
TAPE	**NTSC:** VFM3580KM (14min to 22min) **PAL:** VFM3680KM (14min to 22min)	
M.EQ	Oscilloscope	
TOOL	VFK1178、VFK1148(Hex Driver)	
TEST POINT	VTR1	VTR2
	TP40702	TP45701

1. Playback the Alignment tape.
2. Confirm that the screw G and H are not loosened.
3. Push the tension arm follow the arrow (B) direction as shown in figure as range of T2 post does not move. And confirm that the CUE output level is within specification.
4. If out of specification, loosen the screw G and adjust the screw A, then tighten the screw G with 1.0kg torque.
5. The final touch of the adjustment must be turned clockwise. After this adjustment, confirm that the screw A is not loosened.
6. If adjust the screw A, Confirm that the tape pass condition follow Post Limit Confirmation procedure (item 5-14).



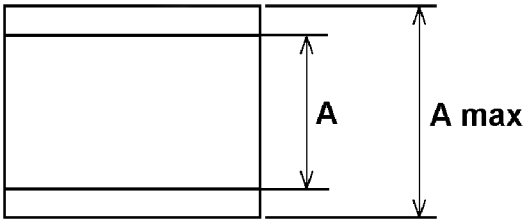


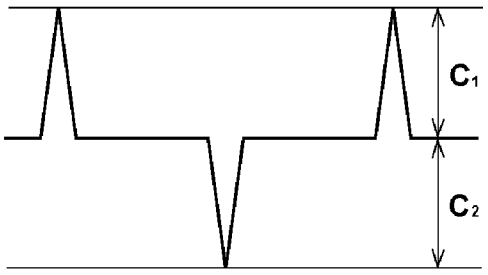


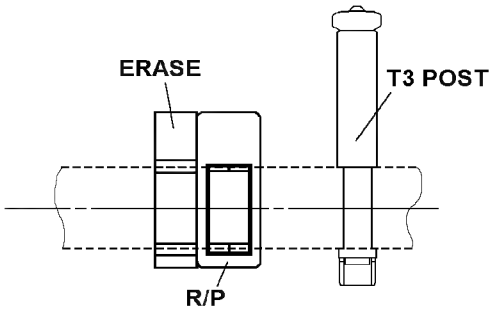
5-20. A/C Head Height Confirmation

SPEC	A≧0.95×Amax、C1、C2 ≧ 160mV			
ADJ.	SCREW B and H(A/C Head)			
MODE	PLAY			
TAPE	**NTSC:** VFM3580KM (14min to 22min) **PAL:** VFM3680KM (14min to 22min)			
M.EQ	Oscilloscope			
TOOL	VFK1150(Nut Driver) VFK1190(Hex Wrench)			
TEST POINT		VTR1		VTR2
	CUE	TP40702(Analog 1)		TP45701(Analog 2)
	CTL	P.C.Board TP2705 (Digital 1)	Schematic TP35705 (Digital 1)	TP33005 (Digital 2)

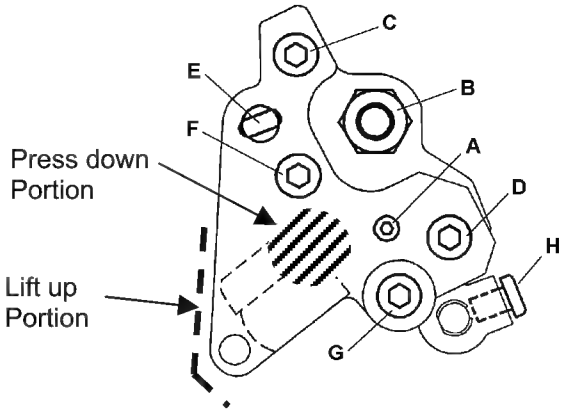
1. Playback the Alignment tape.
2. Press and Lift up to A/C Head lightly as indicated as figure position, then confirm that the CUE output level at TP101 does not increased.
3. If increases CUE output, A/C Head Height adjustment performed. And also confirm that the CTL output level.
4. If adjust the height of A/C Head, Azimuth also changed. Therefore adjust and confirm alternately Height and Azimuth of A/C Head.
5. After screw (H) is tightened, height and tilt of A/C Head are changed. Therefore confirmation of specification must be done after tightening the screw (H).







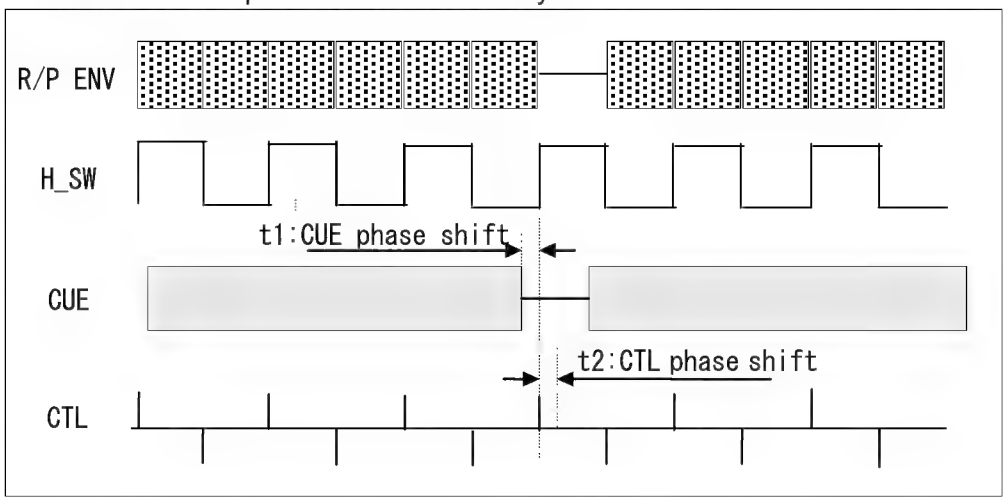
A/C HEAD HEIGHT

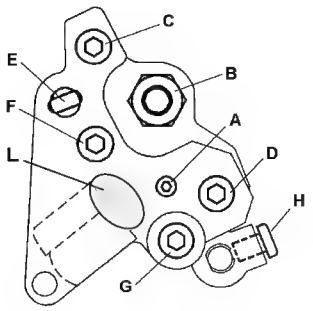


5-21. A/C Head Azimuth and X-value Adjustment.

<table>
<tr><td>SPEC.</td><td colspan="2">AS shown in the below figure.
250us≦t1、t2≦+250us</td><td>MODE</td><td>SERVO ADJUST: “ A09: RP LINEAR P”</td></tr>
<tr><td></td><td colspan="2"></td><td>TAPE</td><td>NTSC: VFM3580KM (X value)
PAL: VFM3680KM (X value)</td></tr>
<tr><td>ADJUSTMENT</td><td colspan="2">A/C Head each screws</td><td>TOOL</td><td>VFK0357(Eccentric Driver)</td></tr>
<tr><td rowspan="6">TEST POINT</td><td></td><td colspan="2">VTR1</td><td>VTR2</td></tr>
<tr><td>CUE</td><td colspan="2">TP40702(Analog 1)</td><td>TP45701(Analog 2)</td></tr>
<tr><td>R/P ENV</td><td colspan="2">TP5001(Digital 1)</td><td>TP5001(Digital 2)</td></tr>
<tr><td>R/P HSW</td><td colspan="2">TP6001(Digital 1)</td><td>TP6001(Digital 2)</td></tr>
<tr><td rowspan="2">CTL</td><td>P.C.Board</td><td>Schematic</td><td rowspan="2">TP33005(Digital 2)</td></tr>
<tr><td>TP2705(Digital 1)</td><td>TP35705(Digital 2)</td></tr>
</table>

1. Open the Service menu and select the item “A09:RP LINEAR P” on Servo Adjust menu for RP Head ATF Playback.
2. Playback the X-value alignment tape (VFM3682KM).
3. Confirm that the phase of CUE and CTL are within specification against RP HSW pulse trigger. If not perform the X-value adjustment follow the below procedure.
4. Adjust A/C Head Azimuth (refer to Azimuth adjustment procedure) so that the CTL and Lack part of CUE(t2) is match in the phase.
5. Confirm the lack track of envelope, and select the HSW correspond with it (The lack track is correspond HSW high with L ch).
6. Adjust X-value so that the reference of HSW and CTL trigger (CTL rising edge is the reference) are match in the phase(t1). To adjust X-value, loosen the screw C and D, adjust the hole E by VFK0357. After adjustment tighten the screw C and D with 2.5Kg torque. At this time adjust the phase simultaneously with Azimuth so that the CTL and CUE phase is kept.
7. Hit the top plate (portion L as shown in below figure) of A/C Head lightly by a pointed end of Eccentric driver , then confirm the phase is not shifted finally.





5-22. REV Tape Pass Confirmation and Adjustment (T4 post height adjustment)

SPEC.	C1、C2≧Cp1、Cp2×0.75 Lower limit at T3 post on REV mode	**TAPE**	**NTSC:** VFM3580KM **PAL:** VFM3680KM
		TOOL	VFK1151(Nut Driver)
		ADJUSTMENT	T4 post height
MODE	REV×1	**M.EQ**	Oscilloscope

TEST POINT	VTR1		VTR2
	P.C.Board	Schematic	TP33005
	TP2705(Digital 1)	TP35705(Digital 1)	

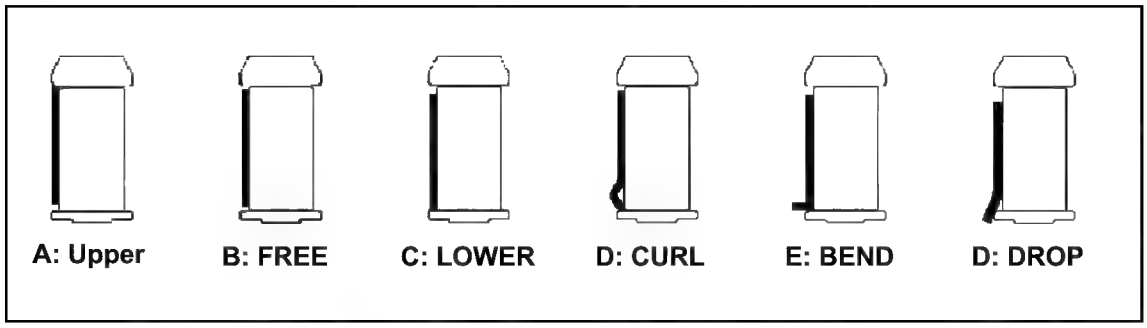
1. Place unit into REV mode, and confirm the post limit and CTL signal are in the specification. If not, adjust T4 post follow the below procedure.
2. Turn the Nut of T4 post clockwise or counterclockwise follow the tape limit condition at T3 post. The maximum rotation angle is 90 degree.
3. Place unit into REV X1 mode and confirm the CTL output level is become more than 75% on play mode. Confirm the tape pass limit become lower limit at T3 post and the tape does not have curl at T3 and T4 post.
4. However out of specification, adjust T4 post height follow the Post Height Pre-adjustment procedure.

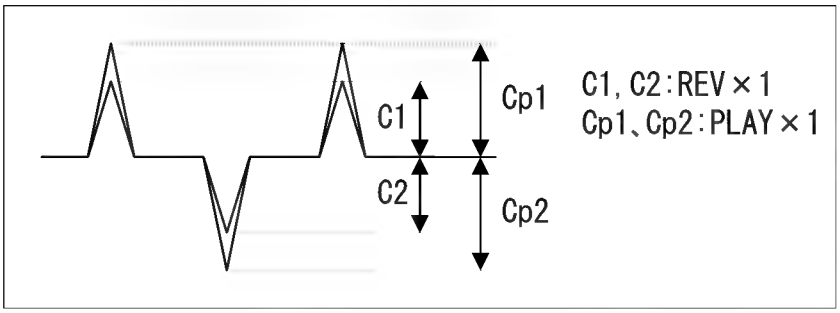
T4 Nut adjustment direction

Direction of adjustment nut of T4 post	CTL level on REV mode	Lower limit at T3 post On REV mode
Tighten direction	Increase	Tape touch to strong
Loosen direction	Decrease	Tape touch to weak

Post Limit

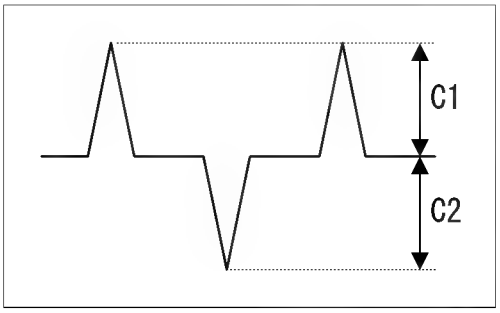
Post Name	Tape limit					
	A	B	C	D	E	F
T3 Post	×	×	O	×	×	×
T4 Post	O	O	O	×	×	×





5-23. CTL Self Recording Level Confirmation

BOARD	Digital 1 or 2		
SPEC.	Refer to below table		
MODE	REC and PLAY		
TAPE	Blank tape		
M.EQ	Oscilloscope		
TEST POINT	VTR1		VTR2
	P.C.Board	Schematic	TP33005
	TP2705	TP35705	



NOTE: This confirmation should be done after each screws of A/C Head are fixed.

1. Record the blank tape.
2. Playback the recorded portion and confirm the CTL level is within specification as shown as below table on PLAY and REV X1 mode.

CTL Output Level C1,C2	
PLAY	REV × 1
C1,C2≧160mV	C1,C2≧120mV

CTL Output Level C1,C2

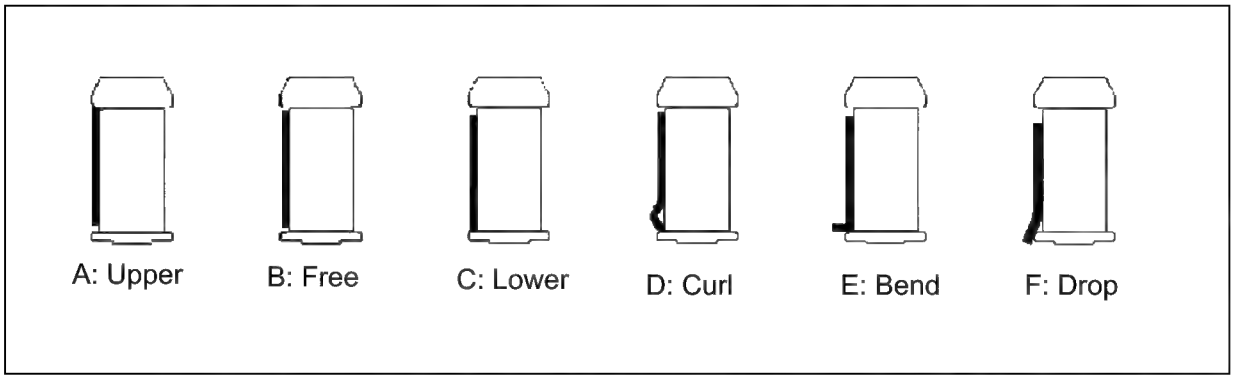
1. PLAY NG → Re-confirm the A/C Head height adjustment.
2. REV NG → Re-confirm the T4 post adjustment.

5-24. PLAY Tape Pass Limit Confirmation

SPEC.	Each Post limit shown in table
MODE	PLAY
TAPE	M cassette (MP tape) tape.　Tape beginning and end portion

Post Name	Tape Limit（Refer the figure）						Adjustment	
	A	B	C	D	E	F		
S5 post	X	O	O	X	X	X	S4、S5 Post	Post Height Pre-Adj.
S4 post	X	X	O	X	X	X		
S1 post	O	X	X	X	X	X	S1 Post	Envelope waveform Adj.
T1 post	O	X	X	X	X	X	T1 Post	Envelope waveform Adj.
T3 post	X	X	O	X	X	X	A/C Head tilt	A/C Head tilt Adj.
T4 post	X	O	O	X	X	X	T4 Post	Post Height Pre-Adj

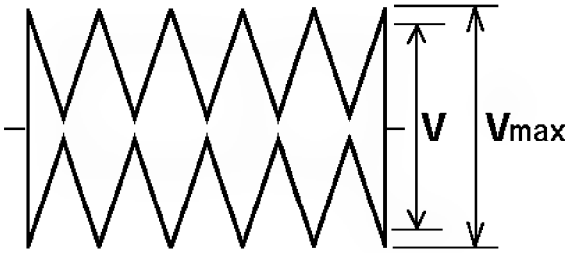
1. Place unit into PLAY mode and confirm the each post limits is within specification.
2. If out of specification, adjust the post height follow the each adjustment procedure (Refer to above table).



5-25. Confirmation of Envelope on REV,REW and FF mode.

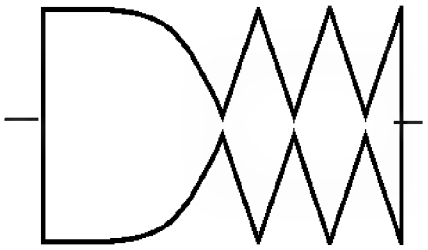
SPEC.	V/Vmax ≧ 0.9
MODE	REV、REW、FF
TAPE	**NTSC:** VFM3580KM **PAL:** VFM3680KM
M.EQ	Oscilloscope
TEST POINT	TP5001:R/P Envelope(Digital 1 and 2) TP6001:TRIG/HSW(Digital 1 and 2)

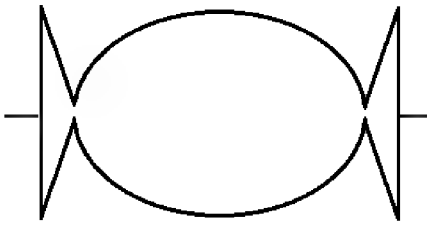
1. Confirm that the Envelope waveform becomes in the specification on REV,REW and FF mode as refer to figure and below.
   - Waveform must be Diamond Style.
   - All the peak level must be more than 90% of maximum level.
     V/Vmax ≧ 0.9
2. If out of spec, adjust S4 post height.



O K

N G





5-26. Confirmation of Play Start Envelope

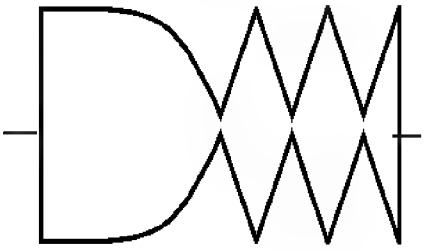
TEST POINT	TP5001:R/P ENV (Digital 1 or 2) TP6001 TRIG/HSW (Digital 1 or 2)
MODE	REW/REV → PLAY Loading completion → PLAY FF → PLAY
TAPE	L cassette (123min、Recorded tape) Tape beginning portion
M.EQ	Oscilloscope

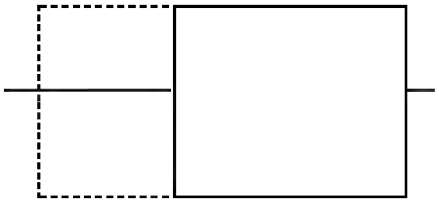
Note: This adjustment must be done after Envelope Waveform Adjustment.。

1. Confirm that the envelope appears immediately, when the mode is changed from REW to PLAY、REV to PLAY、FF to PLAY、and Lording to PLAY mode.
2. If out of spec, adjust S4 post height.

O K

N G



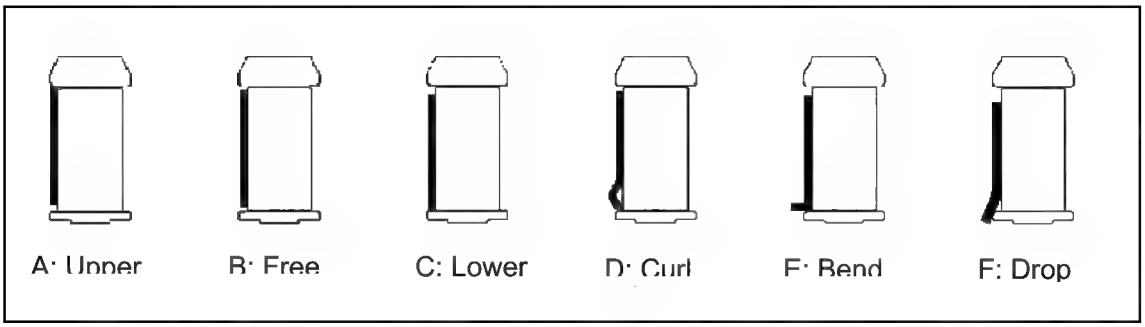


5-27. Tape Pass Limit Confirmation

SPEC	Each Post limit shown in table.
MODE	REV
TAPE	M cassette (MP tape) tape. Tape beginning and end portion

Post Name	Tape Limit(Refer to figure)					
	A	B	C	D	E	F
S5 Post	O	O	O	X	X	X
S4(Tension) Post	X	O	O	X	X	X
S1 Post	O	X	X	X	X	X
T1 Post	O	O	O	X	X	X
T3 Post	X	X	O	X	X	X
T4 Post	X	X	O	X	X	X

1. Place unit into REV mode and confirm the each post limits is within specification.
2. If out of specification, adjust the post height follow the each adjustment procedure (Refer to above table).



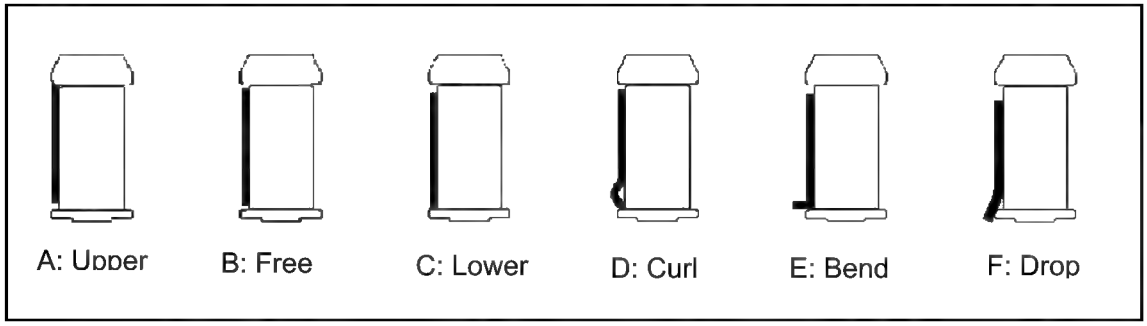
5-28. FF、REW Tape Pass Limit Confirmation

SPEC.	Each Post limit shown in table.
MODE	FF,REW
TAPE	M cassette (MP tape) tape. Tape beginning and end portion

Post Name	Tape Limit(Refer to figurte)					
	A	B	C	D	E	F
S5 Post	O	O	O	X	X	X
S4(Tension) Post	X	O	O	X	X	X
S1 Post	O	X	X	X	X	X
T1 Post	O	O	O	X	X	X
T3 Post	O	O	O	X	X	X
T4 Post	O	O	O	X	X	X

1 Place unit into FF and REV mode and confirm the each post limits is within specification.

2. If out of specification, adjust the post height follow the each adjustment procedure (Refer to above table).

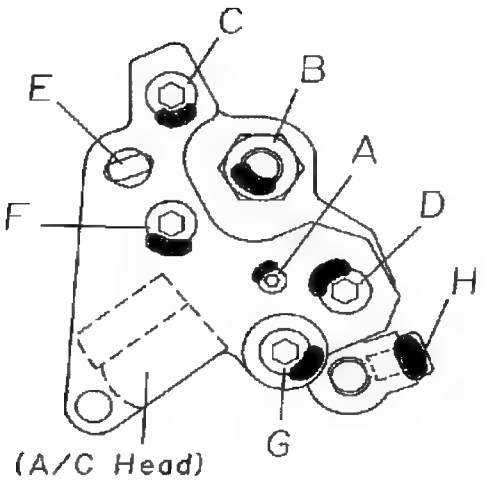


5-29. Screw Lock Tight of A/C Head and T3, T4 Post

[Screw Lock Tight of A/C Head]

	SCREW A	OTHER SCREW
Lock Tight Grew Quantity	1/3 of the screw	1/3 of the screw

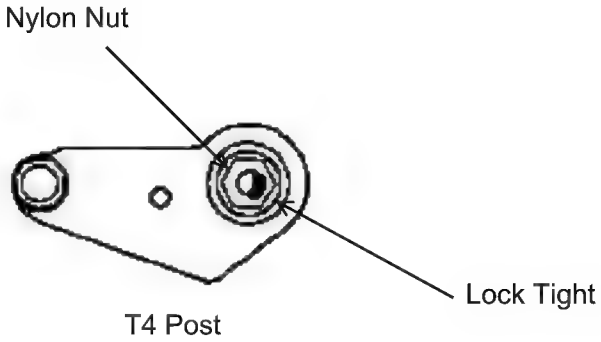
1. Fix the screw by the Lock Tight Grew after adjustment..
2. Before adjustment melt the Grew.



[Screw Lock Tight of T3 and T4 Post]

	T3 Post	T4 Post
Lock tight grew quantity	1/4 of the screw	1/4 of the screw

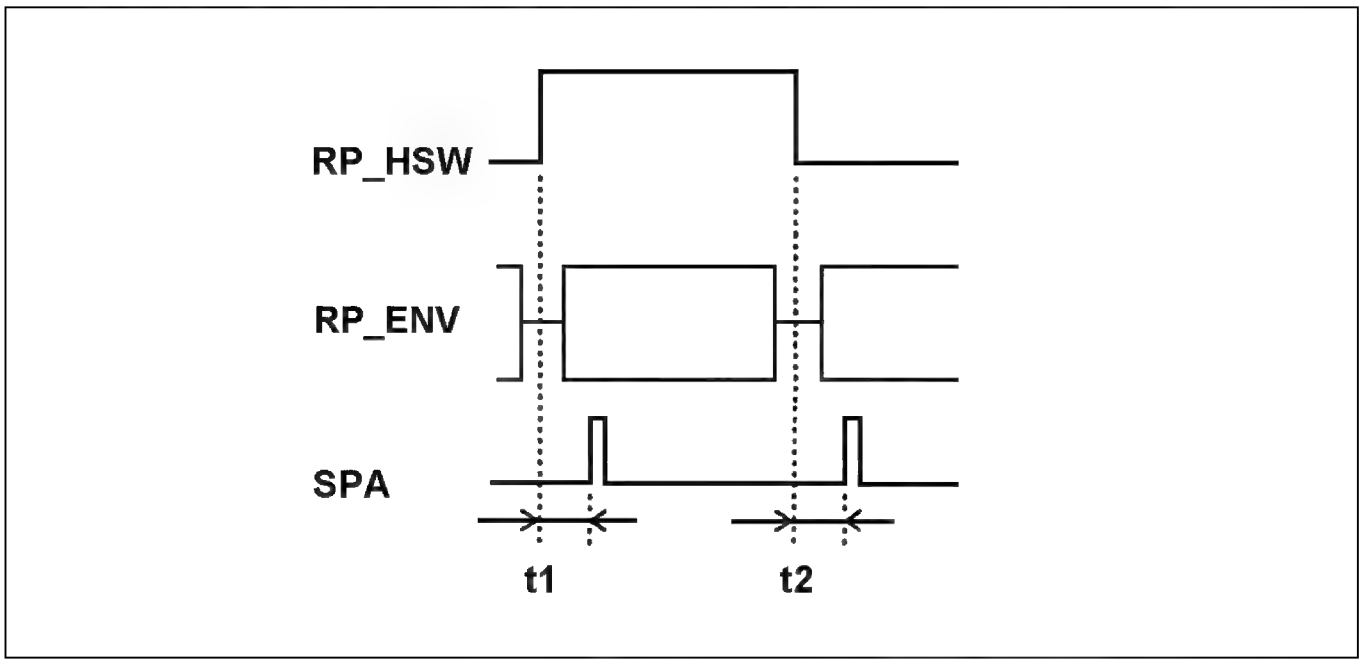
1. After adjustment, attach the lock tight grew at the Nylon nut..
2. Before adjustment, melt the Grew.



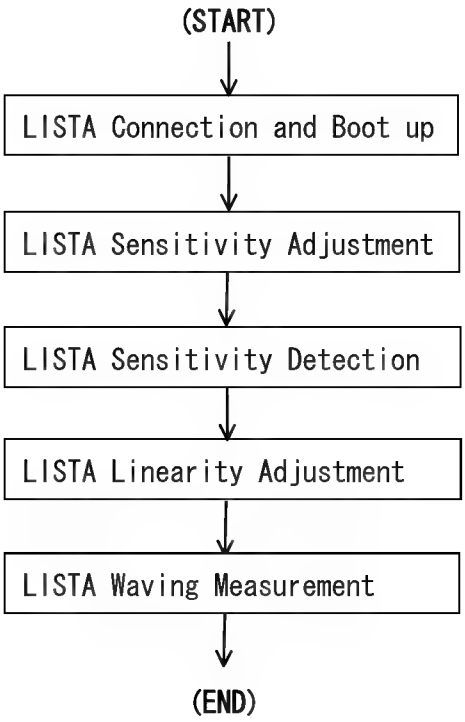
5-30. PG SHIFTER Adjustment

BOARD	Digital 1 and 2			
SPEC.	T1, T2 = 126.4 μsec ± 2 μsec			
MODE	PLAY			
TEST POINT		VTR1 (Digital 1)		VTR2 (Digital 2)
	RP HSW	TP5001		TP5001
	RP ENV	TP6001		TP6001
		P.C.Board	Schematic	
	SPA	TP1301	TP34301	TP1701
ADJUSTMENT	A06:PG RISE, A07:PG FALL (EVR on SERVO ADJUST menu)			
M.EQ	Oscilloscope			
TAPE	**NTSC:** VFM3580KM **PAL:** VFM3680KM			

1. Open the SERVO ADJUST menu on the Service menu and select the item " A06: PG RISE ".
2. Playback the Alignment tape.
3. After light up the SERVO LED, press the SHIFT button and keep it until the numerical value of "A06:PG RISE" are renewed.
4. Select the item "A07:PG FALL" and press the SHIFT button and keep it until the numerical value of "A07:PG FALL" are renewed.
5. Confirm that the period of T1 and T2 in specification (126.4 μsec±2 μsec).



5-31. LISTA Adjustment Procedure.



5-32. LISTA Connection and Boot Up

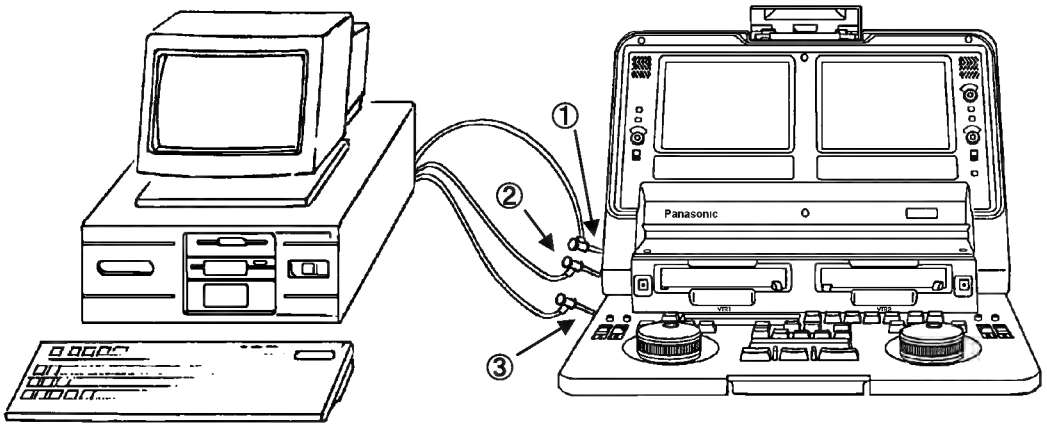
M.EQ	P/C (AD Board should be installed),Oscilloscope			
TAPE	**NTSC:** VFM3581KM (LISTA) **PAL:** VFM3681KM (LISTA)			
TOOL	VFK1481(LISTA Software),VFK1186(LISTA Cable)			
TEST POINT		VTR1(Digital 1)		VTR2(Digital 2)
	HSW R/P	TP6001		TP6001
	HSW PB	TP6002		TP6002
		P.C.Board	Schematic	
	ATF Error	TP2706	TP35706	TP35706
	GND	TG2708	TG35708	TG3008

1. Connect the LISTA Cable to A/D board on PC.
2. Connect the Clips of LISTA Cable to test point on Servo Board as follow as below.(In case of Digital 1)

   ①.ATF : TP2706

   ②.HSW : TP6001 or TP6002

   ③.GND : TP2708



3. Boot up the LISTA software on DOS mode.

★ Install and Boot up.

All files on the floppy disk (VFK1481) copy to created directly on PC(**i.e.** C:¥LISTA).

Type "LISTA" and press ENTER Key, then boot up the LISTA software VFK1481.

4. Select the item " DVCPRO " for format select on the menu.
5. Select the item " AJ-D750 " for selected model on the menu. (AJ-LT85 is equivalent to AJ-D750).
6. After selected model, appeared alignment tape data on the screen for select the Serial number on the alignment tape. But if LISTA software have not resisted data of alignment tape, press the ESC key, then main menu is display on the screen. And select item " <4> Alignment Tape" for entry the data on the attachment sheet, which is enclosed of alignment tape.

＜ How to Entry the Attachment Data of Alignment Tape ＞

1. Select the item “ <4> Alignment Tape “ on the main menu of the LISTA software.
2. Select the item “ <2> ENTRY ” on the alignment tape menu.
3. After display the screen of “ << Alignment tape Data Entry >> “, first input the Serial number follow the printed number on the tape label. And input the number “0” or “1” for select the PAL/NTSC. And after that for entry the tape type, in case of DVCPRO input to “0” , in case of DV input to “1”.
4. After select the Tape type, the frame for input the DATA and CHECK SUM appeared on the screen. Input the numerical value in numerical order on the data sheet, which are enclosed with alignment tape. If input the wrong number, appear the error message on the screen, then confirm that the data on the sheet.
5. After entry the data, select “ <1> SELECT “ on the Alignment Tape menu and select the serial number of the alignment tape.

＜＜Alignment Tape Data Entry＞＞　　Serial No.0596003(NTSC)　18um

[1]	- 0.1
[2]	0.1
[3]	0.0
[4]	0.2
[5]	0.6
[6]	0.5
[7]	0.7
[8]	0.9
[9]	1.0
[10]	0.8

[11]	0.7
[12]	1.0
[13]	0.7
[14]	0.5
[15]	0.2
[16]	- 0.5
[17]	- 0.3
[18]	- 0.3
[19]	- 0.1
[20]	- 0.6

[21]	- 0.4
[22]	- 0.2
[23]	- 0.7
[24]	- 0.6
[25]	- 0.7
[26]	- 0.3
[27]	- 0.4
[28]	- 0.4
[29]	- 0.6
[30]	- 0.3

[31]	- 0.4
[32]	- 0.6
[33]	- 0.3
[34]	- 0.2
[35]	- 0.1
[36]	- 0.3
[37]	- 0.1

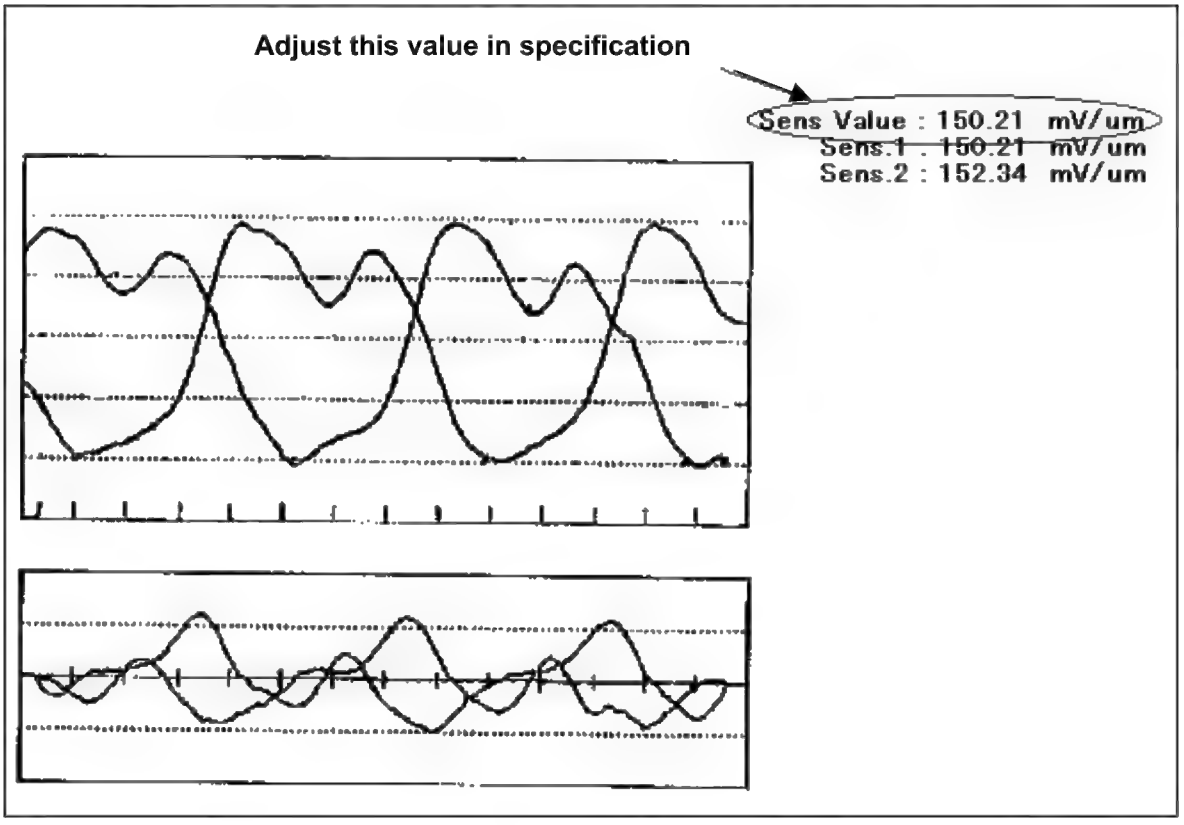
[CS]	- 0.6

5-33. LISTA Sensitivity Adjustment (RP HEAD)

SPEC.	Sensitivity:150±15 (mV/um)			
MODE	PLAY			
TAPE	**NTSC:** VFM3581KM (LISTA) **PAL:** VFM3681KM (LISTA)			
ADJUSTMENT	A13:RP GAIN P			
TEST POINT		VTR1(Digital 1)		VTR2(Digital 2)
	HSW R/P	TP6001		TP6001
		P.C.Board	Schematic	
	ATF Error	TP2706	TP35706	TP33006
	GND	TG2708	TG35708	TG3008

Note: Before the Sensitivity adjustment, Envelope Level adjustment should be performed (Refer to item 4-5 and 4-6 on Section 3 : Part of Electrical Adj.)

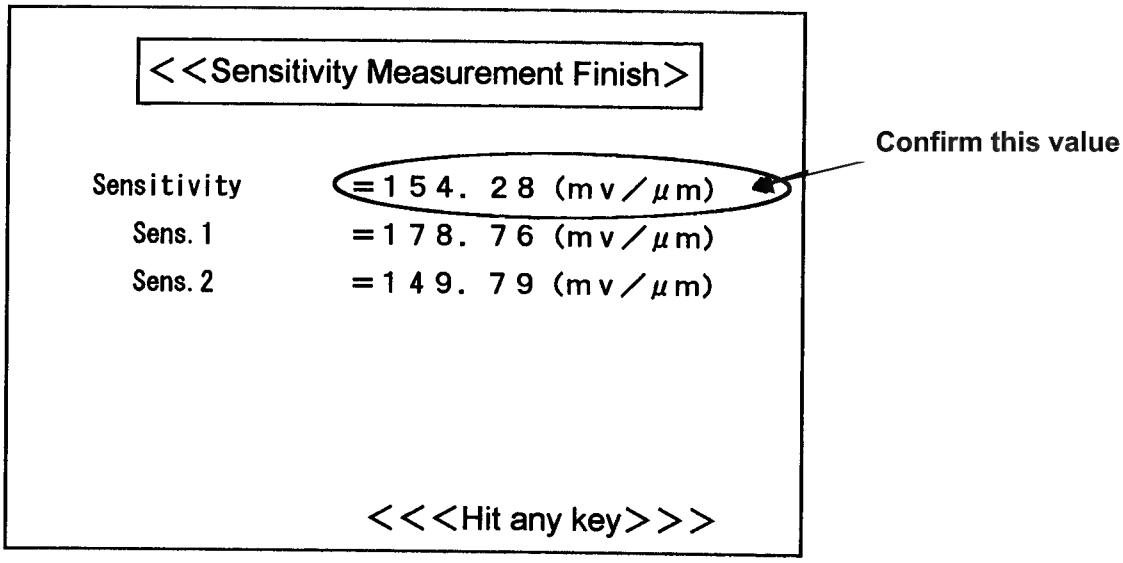
6. Connect the Test Point to clip of LISTA cable for ATF Error signal measurement.
7. Open the SERVO ADJUST menu on Service menu and select the EVR " A13:R/P GAIN P ".
8. Playback the LISTA alignment tape.
9. Select the "**<6> ATF Error Signal Monitor"** on the LISTA main menu and after appear the message " 1.2% Speed… " , press ENTER key, then sensitivity value as real time and waveform appear on the screen as shown as figure below.
10. Adjust EVR " A13 R/P GAIN P " so that the sensitivity value is within specification.
11. After finish this adjustment, press ESC key to exit to the main menu.



5-34. LISTA Sensitivity Detection (RP HEAD)

SPEC	Sensitivity:150±15 (mV/um)			
MODE	PLAY			
ADJUSTMENT	----------			
TAPE	**NTSC:** VFM3581KM (LISTA) **PAL:** VFM3681KM (LISTA)			
TEST POINT		VTR1(Digital 1)		VTR2(Digital 2)
	HSW R/P	TP6001		TP6001
		P.C.Board	Schematic	
	ATF Error	TP2706	TP35706	TP33006
	GND	TG2708	TG35708	TG3008

1. Open the SERVO ADJUST menu on Service menu and select the EVR " A13 R/P GAIN P ".
2. Playback the LISTA alignment tape.
3. Select the " **<1>Sensitivity Measurement"** on the LISTA main menu and after appear the message " 1.2% Speed… " , press ENTER key, then LISTA software start measurement of sensitivity value.
4. Confirm that the sensitivity value is within specification, when the message << Sensitivity Measurement Finish>> and 「Sensitivity = numerical value」 are displayed on the screen.
5. If out of specification, repeat the steps 3 and 4.
6. If still out of specification, perform the "LISTA Sensitivity Adjustment again.

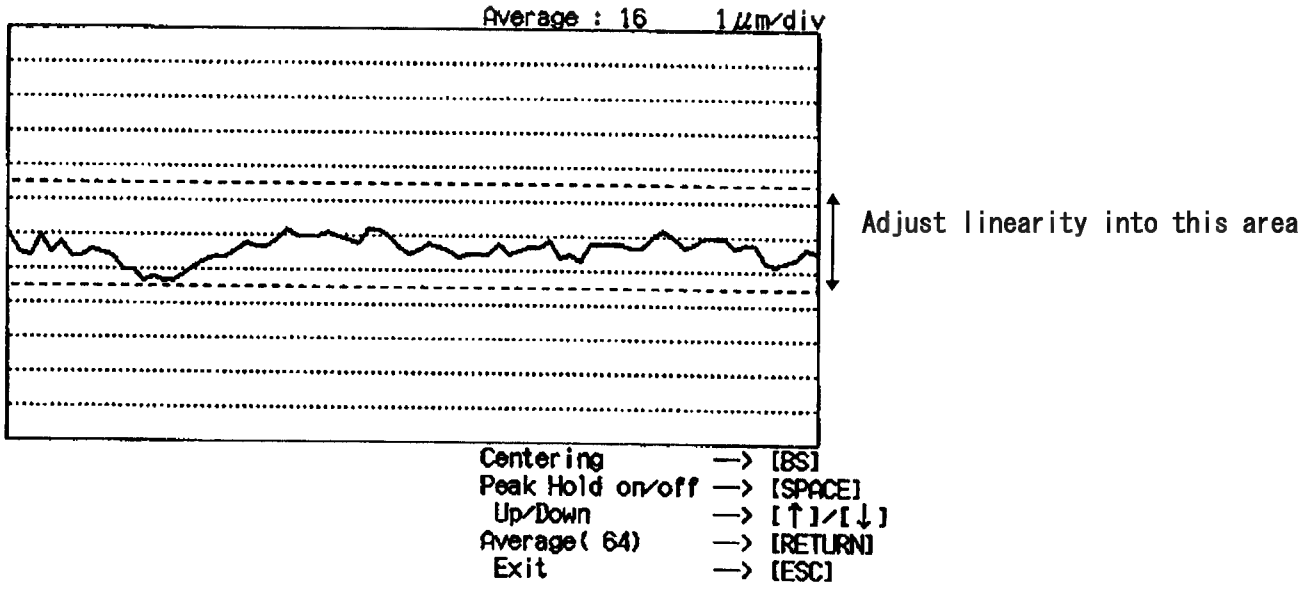


5-35. LISTA Linearity Adjustment and Waving Measurement.

SPEC	Linearity: Less than 3um, Waving: less than 1.5um			
MODE	PLAY (EVR is select to " A09: RP LINEAR P ")			
ADJUSTMENT	S1 and T1 Post Height			
TAPE	**NTSC:** VFM3581KM (LISTA) **PAL:** VFM3681KM (LISTA)			
TEST POINT		VTR1(Digital 1)		VTR2(Digital 2)
	HSW R/P	TP6001		TP6001
		P.C.Board	Schematic	
	ATF Error	TP2706	TP35706	TP33006
	GND	TG2708	TG35708	TG3008

1. Open the SERVO ADJUST menu on Service menu and select the EVR " A07: LR LINEAR P "
2. Playback the LISTA alignment tape.
3. Select the item **" (2) Linearity Measurement "** on the LISTA main menu and display the linearity waveform.
4. When the waveform as shown as below figure is displayed on the screen, press the " BS (back space) " key for display the waveform to center of scale on the screen. And adjust height of S1 and T1 post by Post Driver so that the linearity waveform is become flat as possible, and it should be in the specification.

★ Adjust linearity waveform in the red dot line on the screen.



☆ **POINT:**

The part of left side of waveform(entrance side) is adjusted by height of S1 post and part of right side of waveform(exit side) is adjusted by height of T1 post.

Lower part of above waveform of figure is displayed lead on Cylinder.

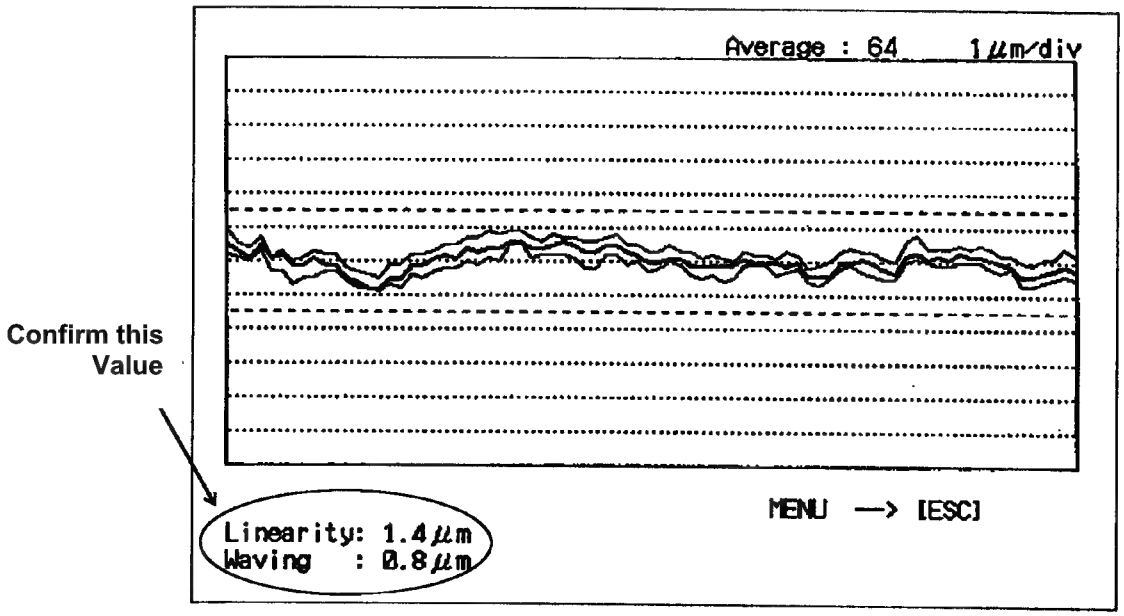
When the post driver is remove from upper part of post, linearity waveform is changed.

After finish this adjustment, eject the tape and insert the tape again for confirm the shape of linearity waveform does not changed.

5. After finish the linearity adjustment, measure the numerical value of linearity and waving.

＊[Waving Measurement]

1. Press “SPACE “ key for make the Peak Hold during 30 seconds, when linearity is displayed.
2. After finish the Peak Hold, press “SHIFT” and “}” ,key simultaneously on the Key Board, then display the numerical values of 「Linearity」 and 「Waving」 on left lower portion of screen. And confirm the numerical values are in the specification. Also confirm the range of waving waveform is same quantity from entrance side to exit side. If the 「Linearity」 and 「Waving」 are out of specification and it caused by not enough limit of entrance or exit side of envelope, then adjust height of S1 and T1 post.
3. After this measurement is finished, press ESC key for return to main menu.



＊NOTE: Saving of LISTA Data

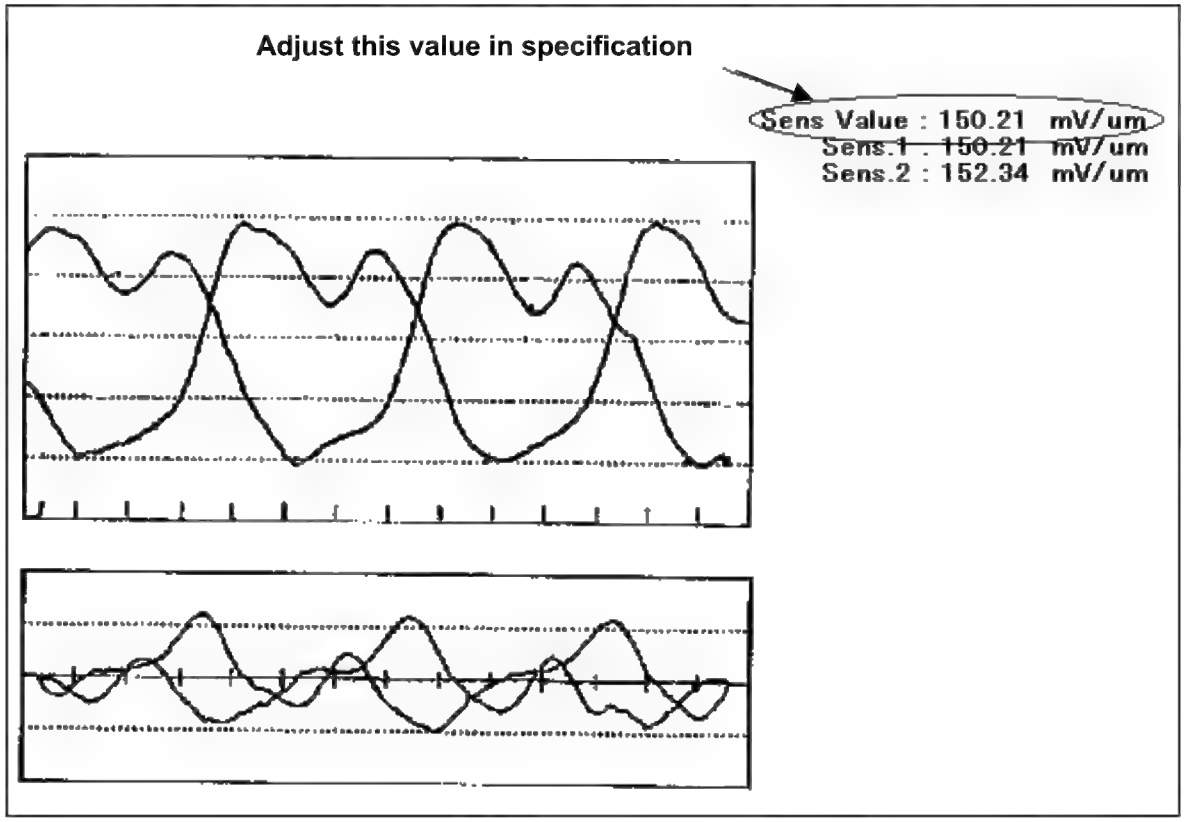
The LISTA software can be saved linearity waveform and measurement value of linearity and waving as one file data to PC.

1. Basically this operation should be performed after linearity and waving measurement finished.
2. Select the item 「(3) Data Save/Load 」 on the LISTA main menu. And after open the menu select the item 「<1> Save」.
3. The linearity waveform as Peak Hold displayed on the screen. And after appeared message “File Name? “ on the screen, entry the File Name and Comment. File Name must be in 8 characters, and comment is must be in 20 characters. As comment, entry the Serial Number, VTR Model Number and Head Rotation Hours etc, for use management of linearity data of each VTR.
4. After completion of saving, select the item 「<2> Load」 on the 「(3) Data Save/Load」 menu, then appear the saved File Name on the screen. And select it previous saved file for confirm the waveform and numerical value displayed correctly. By press “SHIFT” and “}” ,key simultaneously on the Key Board., then display the numerical values of 「Linearity」 and 「Waving」 on left lower portion of screen.

5-36. LISTA Sensitivity Adjustment (PB HEAD)

SPEC.	Sensitivity:150±15 (mV/um)			
MODE	PLAY			
TAPE	**NTSC:** VFM3581KM (LISTA) **PAL:** VFM3681KM (LISTA)			
ADJUSTMENT	A12:PB GAIN P			
TEST POINT		VTR1(Digital 1)		VTR2(Digital 2)
	HSW PB	TP6002		TP6002
		P.C.Board	Schematic	
	ATF Error	TP2706	TP35706	TP33006
	GND	TG2708	TG35708	TG3008

1. Connect the Test Point to clip of LISTA cable for ATF Error signal measurement.
2. Open the SERVO ADJUST menu on Service menu and select the EVR " A12:PB GAIN P ".
3. Playback the LISTA alignment tape.
4. Select the "**<6> ATF Error Signal Monitor"** on the LISTA main menu and after appear the message " 1.2% Speed… " , press ENTER key, then sensitivity value as real time and waveform appear on the screen as shown as figure below.
5. Adjust EVR " A12 PB GAIN P " so that the sensitivity value is within specification.
6. After finish this adjustment, press ESC key to exit to the main menu.

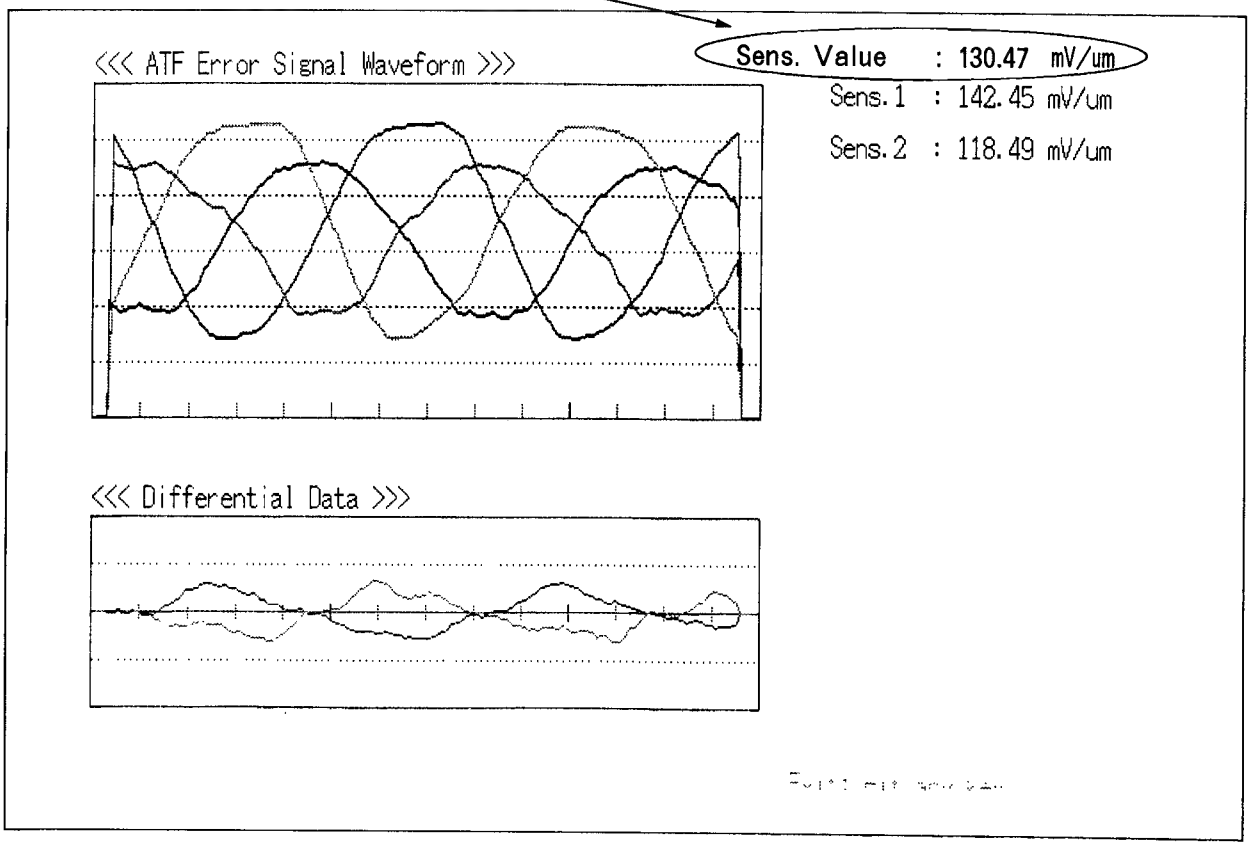


5-37. LISTA Sensitivity Adjustment (DV Compatibility)

SPEC.	Sensitivity:130±30 (mV/um)			
MODE	PLAY			
TAPE	**NTSC:** VFM3581KM (LISTA) **PAL:** VFM3681KM (LISTA)			
ADJUSTMENT	A14:RP GAIN			
TEST POINT		VTR1(Digital 1)		VTR2(Digital 2)
	HSW R/P	TP6001		TP6001
		P.C.Board	Schematic	
	ATF Error	TP2706	TP35706	TP33006
	GND	TG2708	TG35708	TG3008

1. Connect the Test Point to clip of LISTA cable for ATF Error signal measurement.
2. Open the SERVO ADJUST menu on Service menu and select the EVR " A14:R/P GAIN ".
3. Playback the LISTA alignment tape.
4. Select the "**<6> ATF Error Signal Monitor"** on the LISTA main menu and after appear the message " 1.2% Speed… " , press ENTER key, then sensitivity value as real time and waveform appear on the screen as shown as figure below.
5. Adjust EVR " A14 R/P GAIN " so that the sensitivity value is within specification.
6. After finish this adjustment, press ESC key to exit to the main menu.

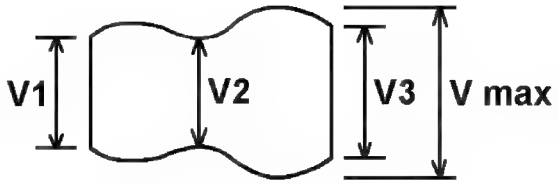
Adjust this value in the specification



5-38. Self-Recording Playback Envelope Waveform Confirmation

SPEC	V1/Vmax、V2/Vmax、V3/Vmax ≧ 0.8
TEST POINT	TP5001:R/P ENV (Digital 1 and 2) TP6001 :TRIG/HSW (Digital 1 and 2)
ADJUSTMENT	S1 and T1 Post Height
MODE	PLAY
TAPE	Blank Tape
M.EQ	Oscilloscope
TOOL	VFK1149(Post Driver)

1. Record the color bar signal.
2. Play back the recorded portion and confirm that the envelope output is within specification
3. If out of specification, perform the Envelope Waveform and LISTA adjustment again.



6. MAJOR MECHANISM PARTS REPLACEMENT AND ADJUSTMENT PROCEDURE

GENERAL

When mechanical parts are replaced, pay attention to the following notes.

1. Always turn power off before replacing any parts.
2. If any adjustment is necessary after the parts is replaced, perform the adjustment after replacement.
3. Use proper hard tools of fixtures.
4. Be sure to clean the parts after replacement, Also when the mechanical parts are replaced, follow the replacement procedure.

6-1. Cylinder Unit Replacement

(Removal)

1. Remove the Top Case Unit (Refer to item [2-1. Removal of Top Case Unit]).
2. Remove the Bottom Case Unit (Refer to item [2-3. Removal of Bottom Panel]).
3. Open the P.C.Board Unit and remove the Shield Plate.
4. Unscrew the 2 screws and remove the T1 GUIDE (Refer to item 6-8-1).
5. Remove the cleaning Arm Unit (Refer to item 6-8).
6. Disconnect the connector P5002 and P5003 for each VTR on the RF AMP P.C.Board. And remove the screw which is fixed with the flexible cable as shown in Figure 6-1-1.

Note: Be careful when remove the flexible cable from the connector for flexible cable. Please refer to how remove the connector as shown in Figure 6-1-4.

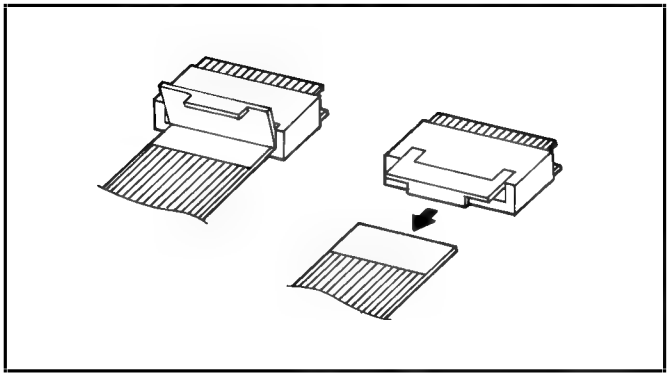


Fig. 6-1-4

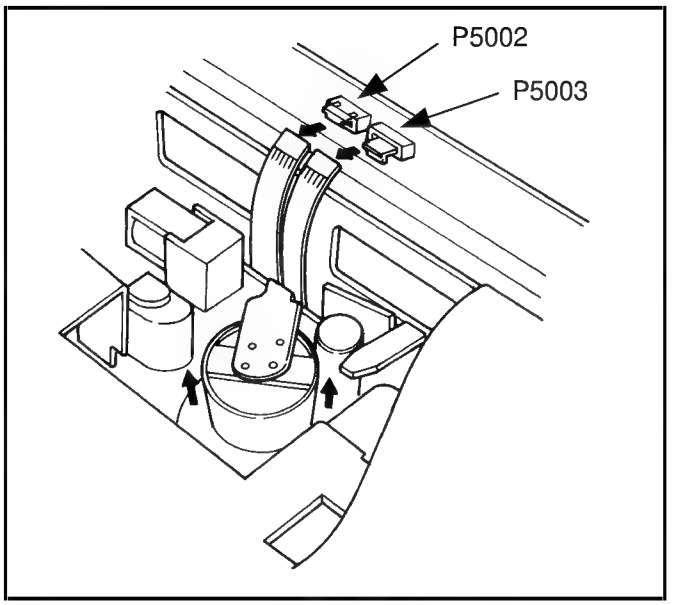


Fig. 6-1-1

6. Disconnect the connector P33 on the Mech Interface P.C.Board. And remove the 3 screws which have spring from the Cylinder Unit, then remove the Cylinder Unit without touching any mechanical parts as shown in Figure 6-1-2.

Note: Never touch the cylinder by finger directly, when pull out the Cylinder Unit.

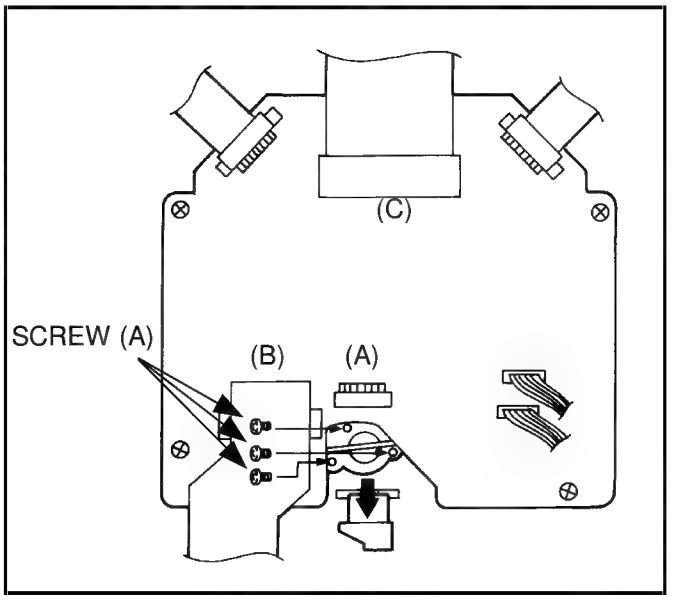


Fig. 6-1-2

(Installation)

1. Install the new Cylinder Unit on the previous steps in reverse order.
2. After installation of T1 Guide, T1 Guide position adjustment should be performed as follows.

Note: When install the Cylinder Unit, the pin on Mech chassis should be match to hole of Cylinder Unit as shown in Figure 6-1-3.

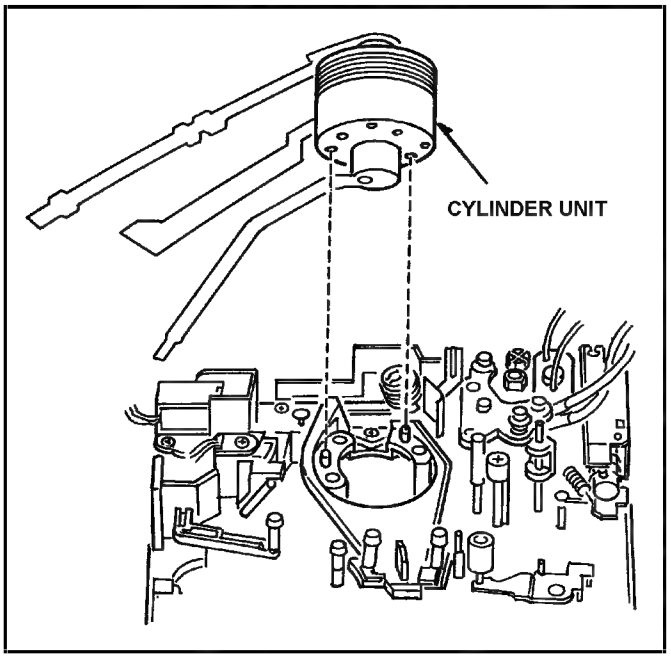


Fig. 6-1-3

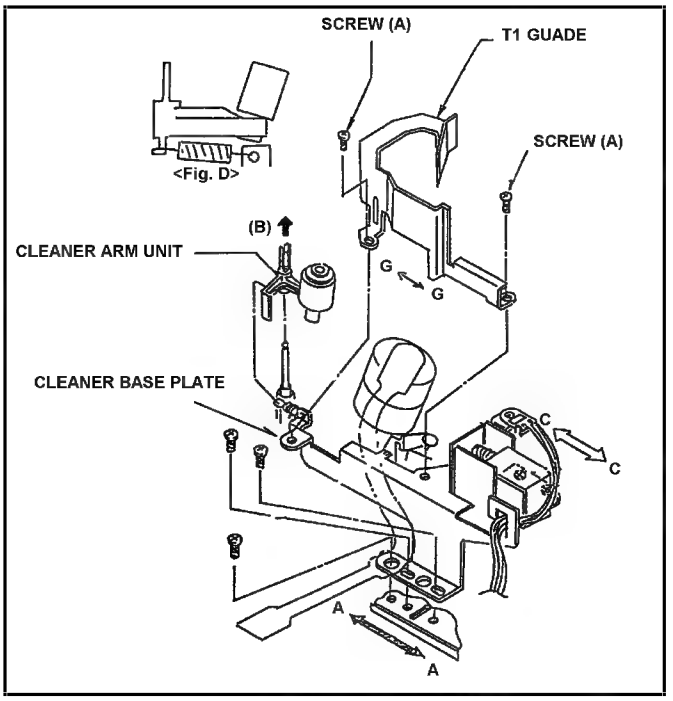
[T1 Guide Position Adjustment]

1. Place the Loading completed position.

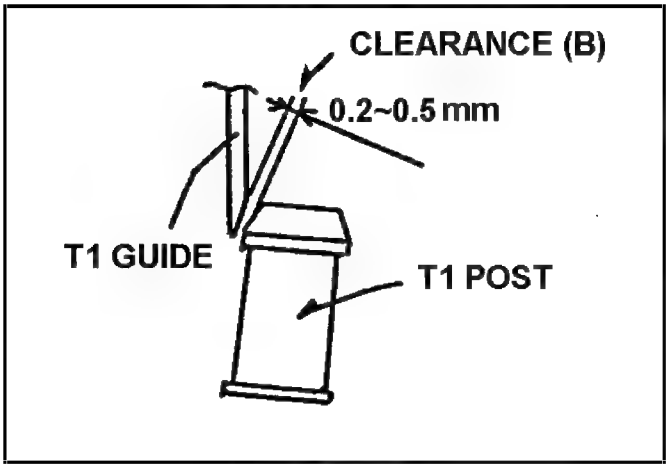
< How to making the Loading Condition >

1. Open the "Servo Adjust" menu in the "Service Menu".
2. Select the item "T TORQUE" and press the ENTER button for making the loading condition and turn power to off.

2. Observe the clearance (B) between T1 Guide and T1 post as shown in Figure. And make sure that it is within 0.2 to 0.5mm.
3. If not, loosen the 2 screws (A) and adjust the position of T1 Guide by moving arrow direction (G ⇔ G) so that the clearance (B) is within specification. And tighten the 2 screws (A).



Removal of Cleaner Roller Unit



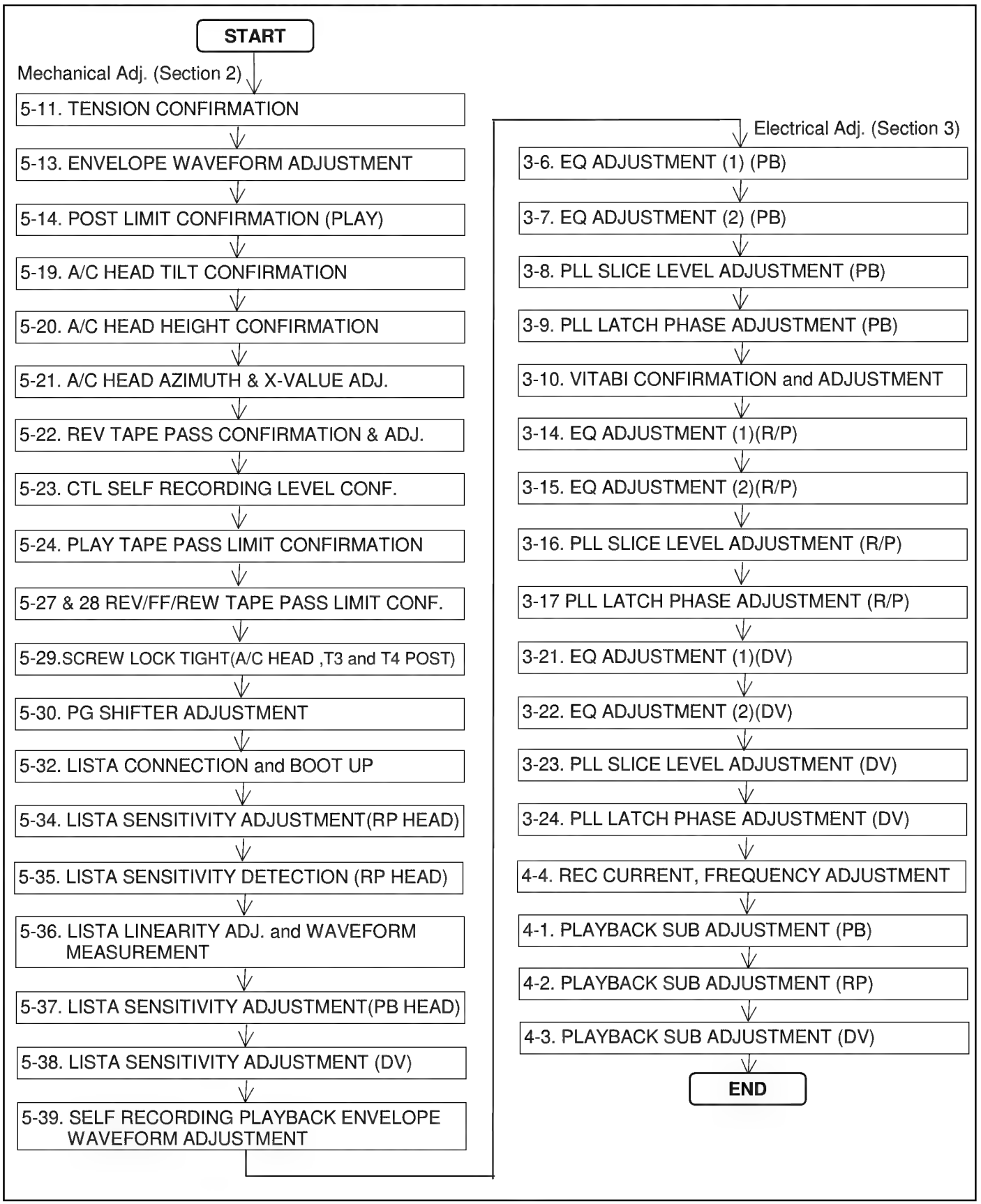
Adjust of T1 Guide

6-1-1. Adjustment Flow Chart After Cylinder Unit Replacement

1. After change the Cylinder Unit, please perform the following steps.

ADJUSTMENT FLOWCHART AFTER DRUM UNIT & MECH CHASSIS REPLACEMENT

Note: Please confirm the condition of Linearity before Head replacement. The number indicated as below chart, which is indicated as item number on the Service manual.


START
Mechanical Adj. (Section 2)
5-11. TENSION CONFIRMATION
5-13. ENVELOPE WAVEFORM ADJUSTMENT
5-14. POST LIMIT CONFIRMATION (PLAY)
5-19. A/C HEAD TILT CONFIRMATION
5-20. A/C HEAD HEIGHT CONFIRMATION
5-21. A/C HEAD AZIMUTH & X-VALUE ADJ.
5-22. REV TAPE PASS CONFIRMATION & ADJ.
5-23. CTL SELF RECORDING LEVEL CONF.
5-24. PLAY TAPE PASS LIMIT CONFIRMATION
5-27 & 28 REV/FF/REW TAPE PASS LIMIT CONF.
5-29.SCREW LOCK TIGHT(A/C HEAD ,T3 and T4 POST)
5-30. PG SHIFTER ADJUSTMENT
5-32. LISTA CONNECTION and BOOT UP
5-34. LISTA SENSITIVITY ADJUSTMENT(RP HEAD)
5-35. LISTA SENSITIVITY DETECTION (RP HEAD)
5-36. LISTA LINEARITY ADJ. and WAVEFORM MEASUREMENT
5-37. LISTA SENSITIVITY ADJUSTMENT(PB HEAD)
5-38. LISTA SENSITIVITY ADJUSTMENT (DV)
5-39. SELF RECORDING PLAYBACK ENVELOPE WAVEFORM ADJUSTMENT
Electrical Adj. (Section 3)
3-6. EQ ADJUSTMENT (1) (PB)
3-7. EQ ADJUSTMENT (2) (PB)
3-8. PLL SLICE LEVEL ADJUSTMENT (PB)
3-9. PLL LATCH PHASE ADJUSTMENT (PB)
3-10. VITABI CONFIRMATION and ADJUSTMENT
3-14. EQ ADJUSTMENT (1)(R/P)
3-15. EQ ADJUSTMENT (2)(R/P)
3-16. PLL SLICE LEVEL ADJUSTMENT (R/P)
3-17 PLL LATCH PHASE ADJUSTMENT (R/P)
3-21. EQ ADJUSTMENT (1)(DV)
3-22. EQ ADJUSTMENT (2)(DV)
3-23. PLL SLICE LEVEL ADJUSTMENT (DV)
3-24. PLL LATCH PHASE ADJUSTMENT (DV)
4-4. REC CURRENT, FREQUENCY ADJUSTMENT
4-1. PLAYBACK SUB ADJUSTMENT (PB)
4-2. PLAYBACK SUB ADJUSTMENT (RP)
4-3. PLAYBACK SUB ADJUSTMENT (DV)
END

6-2. A/C Head Replacement

6-2-1. Replacement

※ Tools required:
Nut Driver (5.5m/m)(VFK1150)
Hex Driver (VFK1148)
Hex Wrench (VFK1190)

(Removal)

1. Remove the Top Case Unit (Refer to item [2-1. Removal of Top Case Unit]).
2. Open the P.C.Board Unit and remove the Shield Plate.
3. Loosen the hex screw (B) and remove the Nut (C). Hang off the Head Height Adjustment Spring and then remove the A/C Head Unit as shown in Figure 6-2-3.

Point: Memorized height of Nut (C) before remove the Nut (C),

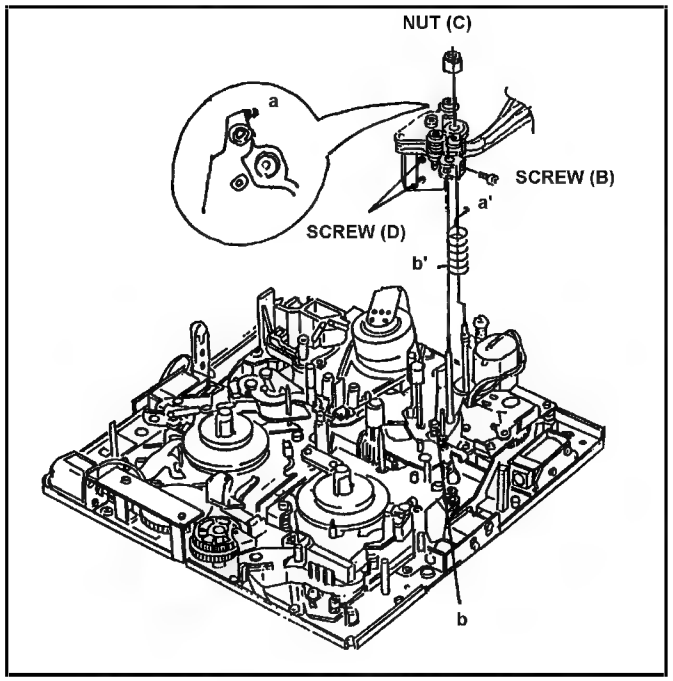


Fig. 6-2-3 Removal of A/C Head Unit

3. Remove the 2 screws (A) and disconnect the connector P5004 on the RF AMP and P30 on the Servo P.C.Board, then remove the A/C Head from the A/C Head Plate.

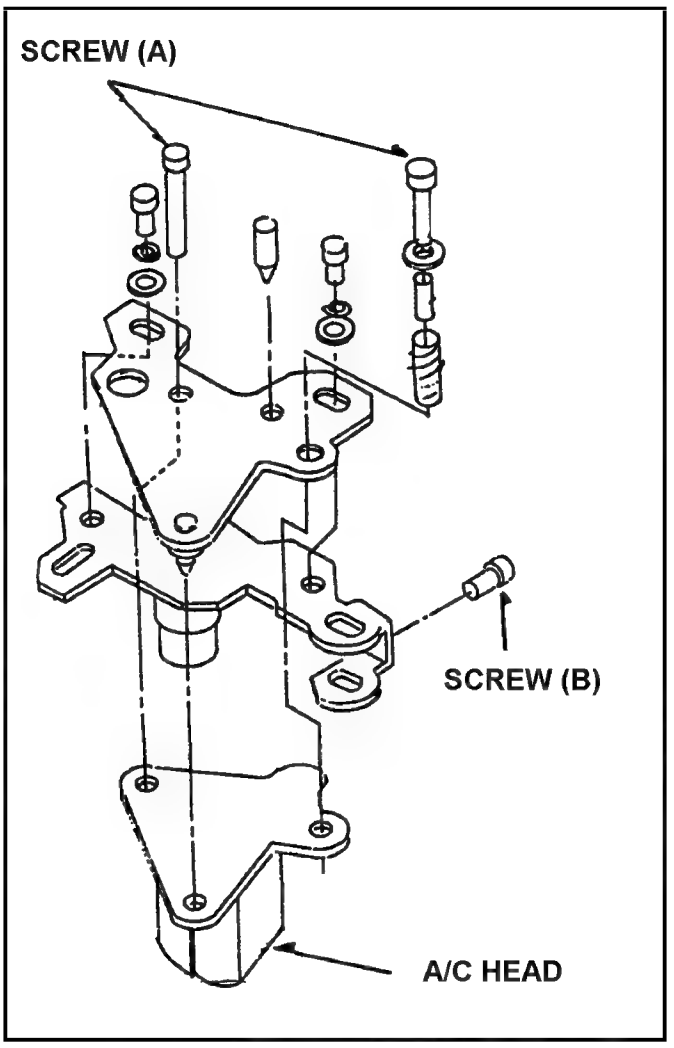


Fig. 6-2-1 Removal of A/C Head

4. Remove the Shield Cover by removing 2 screws (D) as shown in Figure 6-2-3.
5. Unsolder the lead wires (When unsolder the lead wires, do not unsolder all at the same time).

(Installation)

1. Remove the Shield Case from the New A/C Head and solder the lead wires to New A/C Head (Refer to Figure 6-2-2).
2. Reinstall the shield case to A/C Head.
3. Install the A/C Head to A/C Head Plate by tight 2 screws (A), then set to parallel the gap between A/C Head and A/C Head Plate.
4. Install the A/C Head Unit.
5. Hang on the Head Height Adjustment Spring and tighten the Nut (C).
6. Clean the surface of the A/C Head.

Note: After installation, Mechanical and Electrical adjustments should be performed and the hex screw (B) is kept loose until finish the A/C Head Height Adjustment.

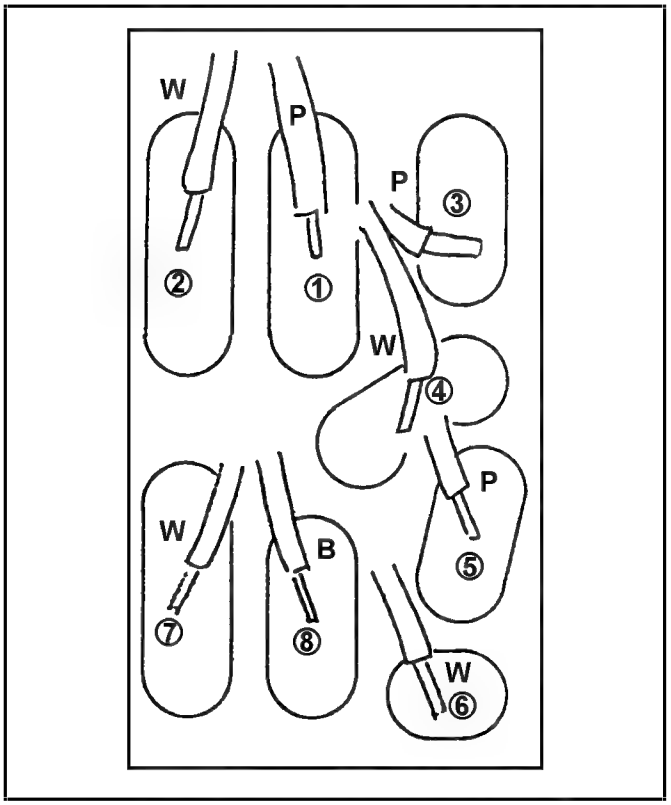
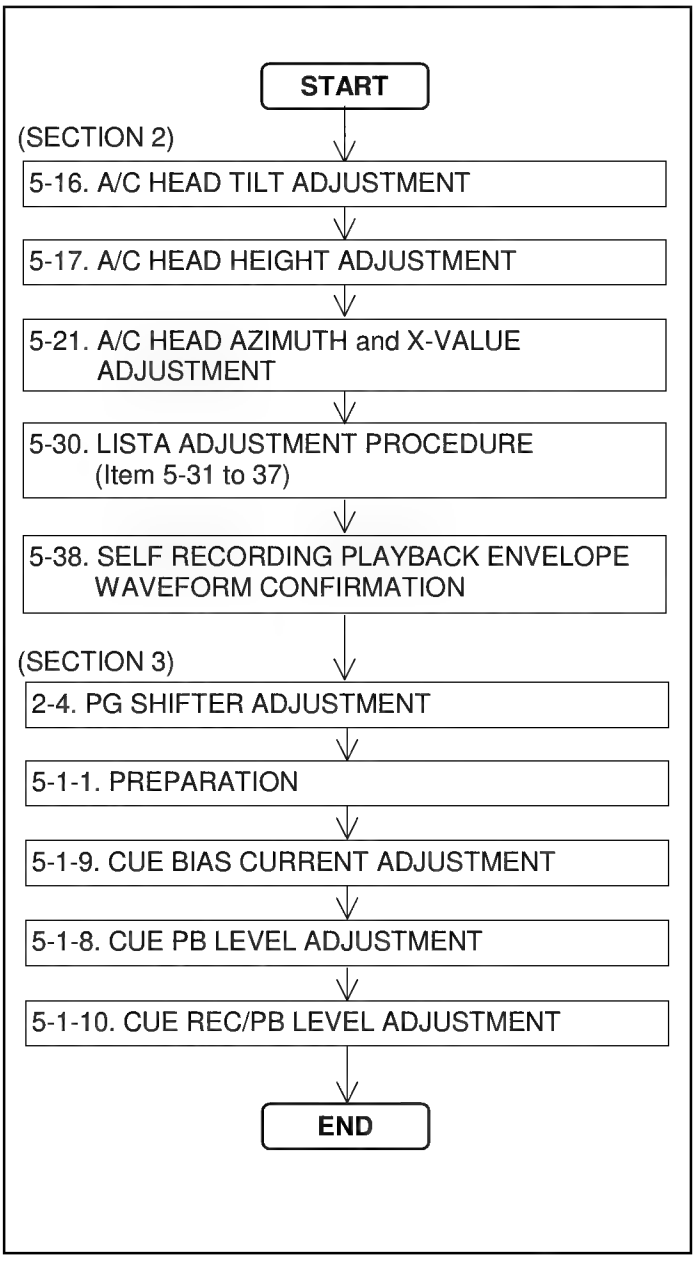


Fig. 6-2-2 Connection of A/C Head

A/C Head Side	Cable Color		Connector No.
1	PINK	YELLOW	P1
2	WHITE		
3	PINK	RED	
4	WHITE		
5	PINK	GREEN	
6	WHITE		
7	WHITE	YELLOW	P30
8	BLACK		

6-2-2. Adjustment Flowchart After A/C Head Adjustment

1. After change the A/C Head, please perform the following steps.


START
(SECTION 2)
5-16. A/C HEAD TILT ADJUSTMENT
5-17. A/C HEAD HEIGHT ADJUSTMENT
5-21. A/C HEAD AZIMUTH and X-VALUE ADJUSTMENT
5-30. LISTA ADJUSTMENT PROCEDURE (Item 5-31 to 37)
5-38. SELF RECORDING PLAYBACK ENVELOPE WAVEFORM CONFIRMATION
(SECTION 3)
2-4. PG SHIFTER ADJUSTMENT
5-1-1. PREPARATION
5-1-9. CUE BIAS CURRENT ADJUSTMENT
5-1-8. CUE PB LEVEL ADJUSTMENT
5-1-10. CUE REC/PB LEVEL ADJUSTMENT
END

6-3. Supply and Take Up Reel Rotor Unit Replacement

(Removal)

1. Remove the Top Case Unit (Refer to item [2-1. Removal of Top Case Unit]).
2. Remove the Front Loading Unit (Refer to item [2-7. Removal of Front Loading Unit]).
3. Remove the Bottom Case Unit (Refer to item [2-3. Removal of Bottom Case Unit]).
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Disconnect the connector P34 and P35 on the Servo P.C.Board as shown in Figure 6-3-1.
6. Move the S1 post to loading direction by manual ejecting method until the screw (C) can removing position.
7. Confirm the supply and Take Up Brake are not release.
8. Press the iron core of M stopper solenoid to release the M stopper.
9. Remove the 4 screws (C), (D) and (E) as shown in Figure 6-3-1.
10. Remove the Supply and Take Up Reel Rotor Unit and Reel Outer Rail.

Note: Memorized the groove position of Reel Base, which inserted the pin of Drive Arm Unit.

(Installation)

1. Through in the Reel Outer Rail to New Supply and Take Up Reel Rotor Unit.
2. Hang on the Reel Rotor Unit to Reel Inner Rail and Install the Reel Rotor Unit then the pin of Drive Arm Unit should be matched with groove position of Reel Base as shown in Figure 6-3-3.
3. Install the 4 screws (C), (D) and (E).
4. Confirm that the Reel Rotor Unit moving smoothly on the Rail by hand.
5. Move the Reel Rotor Unit to front side by hand and then pull up the iron core of M stopper solenoid for operating M stopper.
6. Set the unloading condition by turn the Emergency shaft counter-clockwise.
7. Confirm that the Main Brake Torque. (Refer to item 5-3).
8. Connect the Flexible Cable to Connector P34 and P35 on the Servo P.C.Board.
9. Adjust the T Reel Torque Offset value (Refer to item 2-1 of section 3).
10. Adjust the S Reel Torque Offset value (Refer to item 2-2 of section 3).
11. Adjust the Motor Torque Offset value (Refer to item 2-3 of section 3).
12. Confirm that the Tension value on playback mode (Refer to item 5-11).

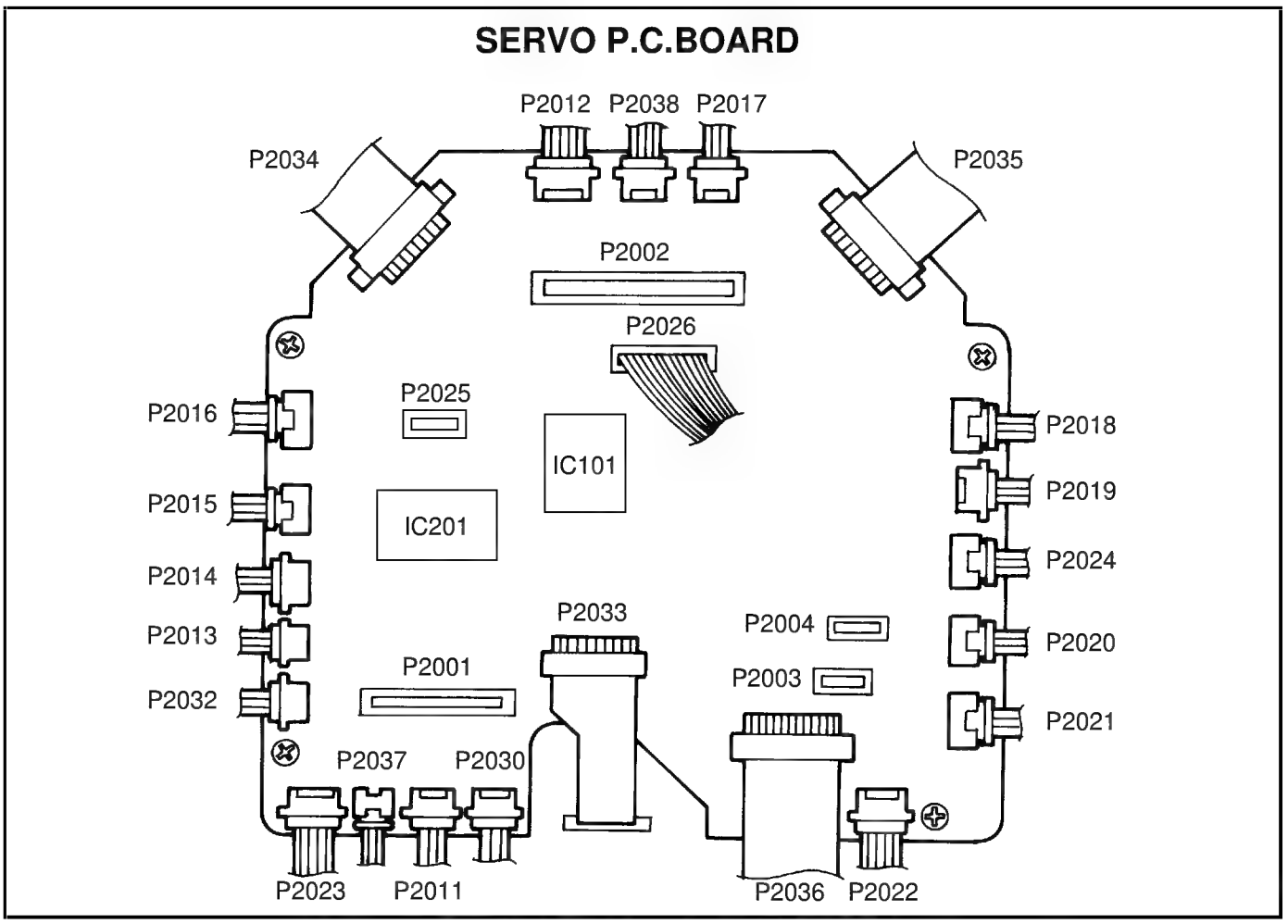


Fig. 6-3-1 Connection of Servo P.C.Board

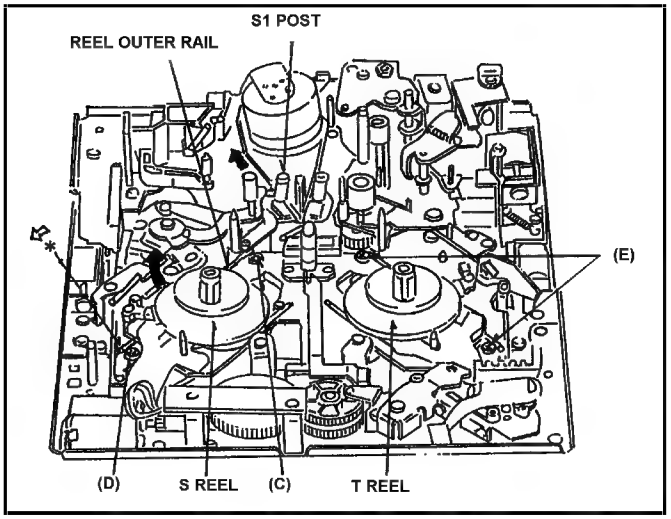


Fig. 6-3-2 Removal of S & T Reel Rotor Unit

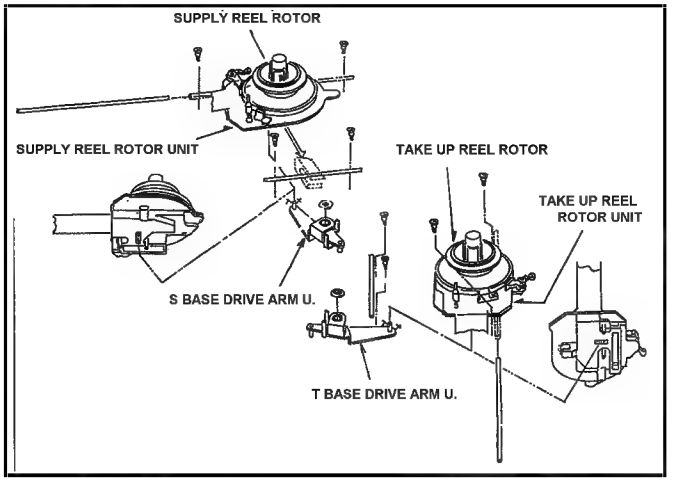


Fig. 6-3-3 Install of S & T Reel Rotor Unit

6-4. Loading Motor Unit Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Disconnect the connector P21 on Servo P.C.Board as shown in Figure 6-3-1.
6. Remove the Pinch Solenoid Unit (Refer to item 6-9).
7. Remove the Pinch Solenoid Lever. (Refer to item 6-5).
8. Unscrew the screw (B), and remove the Emergency Shaft as shown in Figure 6-4-1.
9. Unscrew the 2 screws (C) and remove the Loading Motor Neutral Unit as shown in Figure 6-4-1.
10. Unscrew the 2 screws (D) and remove the Loading Motor Unit as shown in Figure 6-4-1.

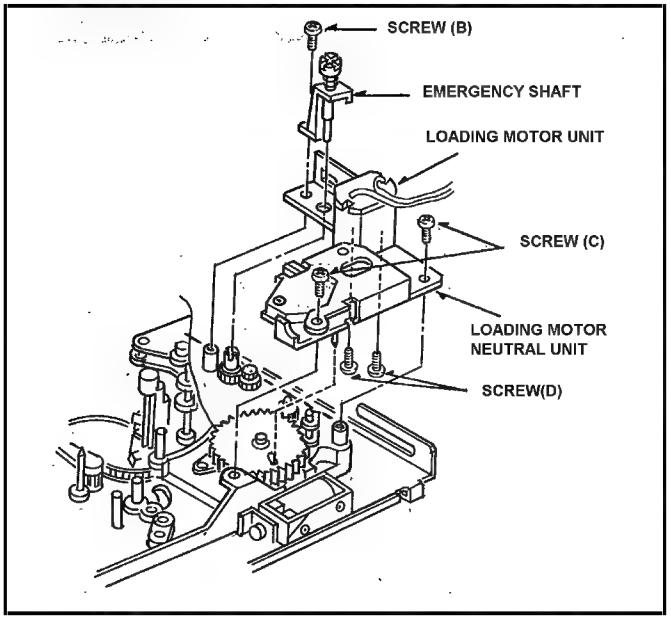


Fig. 6-4-1 Removal o Loading Motor Unit

(Installation)

1. Install the new Loading Motor Unit to Loading Motor Neutral Unit by tightening 2 screws (D).
2. Install the Loading Motor Neutral Unit by tightening the 2 screws (C), then be careful that the pin of Mode SW Unit should be matched to groove position of main Cam Gear.
3. Install the Emergency Shaft by tightening the screw (B).
4. Install the Pinch Solenoid Unit and after installation it, Pinch Solenoid Position adjustment is required. (Refer to item 5-3).

6-5. Pinch Arm Unit Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Disconnect the connector P20 on the Servo P.C.Board as shown in Figure 6-3-1.
6. Remove the Pinch Solenoid Unit (Refer to item 6-9, then hang off the Pinch Solenoid Lever as shown in Figure 6-5-1.
7. Remove the cut washer (A) and remove the Pinch Solenoid Lever as shown in Figure 6-5-1.
8. Remove the cut washer (B) and remove the Pinch Arm Unit as shown in Figure 6-5-1.

(Installation)

1. Install the new Pinch Arm Unit follow the removal steps in reverse order then Pinch Solenoid Position Adjustment is necessary (Refer to item 5-2).

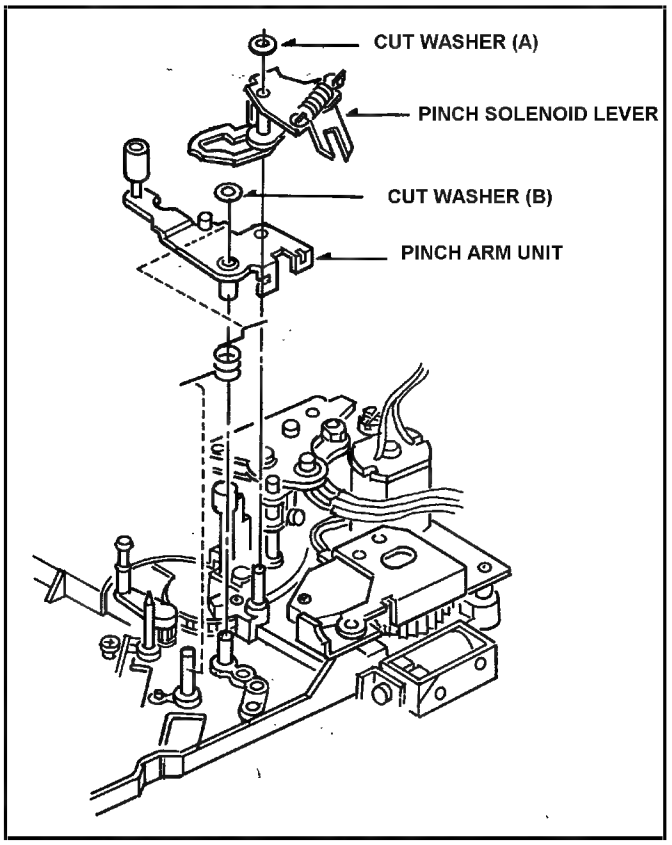


Fig. 6-5-1 Removal of Pinch Arm Unit

6-6. Supply and Take Up Brake Arm Unit Replacement

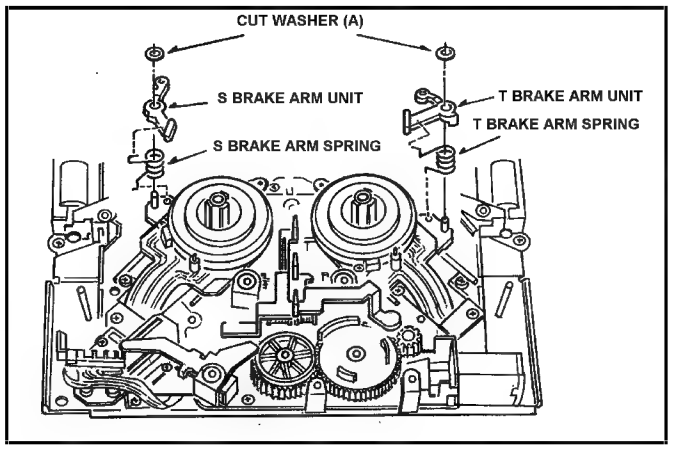
(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Press the iron core of Brake Solenoid for release the Brake.
4. Remove the cut washers (A) and remove the supply and Take Up Brake Arm Unit as shown in Figure 6-6-1.

(Installation)

1. When install the new Brake Arm Unit first, hang on the Brake Arm Spring as shown in Figure 6-6-1.
2. Follow the previous steps in reverse order.
3. Main Brake Torque confirmation is required (Refer to item 5-4).
4. Confirm that the Tension value on the Playback mode (Refer to item 5-16).

Fig. 6-6-1 Removal of S & T Brake Arm Unit



6-7. Mode Select Switch Unit Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Disconnect the connector P22 on the Servo P.C.Board as shown as Figure 6-3-1.
6. Remove the Pinch Solenoid Unit and Loading Motor Neutral Unit (Refer to item 6-4).
7. Remove the screw (D) and remove the Mode Select Switch Unit from Loading Motor Neutral Unit as shown in Figure 6-7-1.

(Installation)

1. Install the New Mode Select Switch Unit follow the removal steps in reverse order (Please refer to item [6-4. Loading Motor Unit Replacement]).

Note: Be careful the pin of Mode Switch Unit should be matched to groove of Main Cam Gear.

2. After install the Pinch Solenoid Unit, Pinch Solenoid Position adjustment is required (Refer to item 5-2).

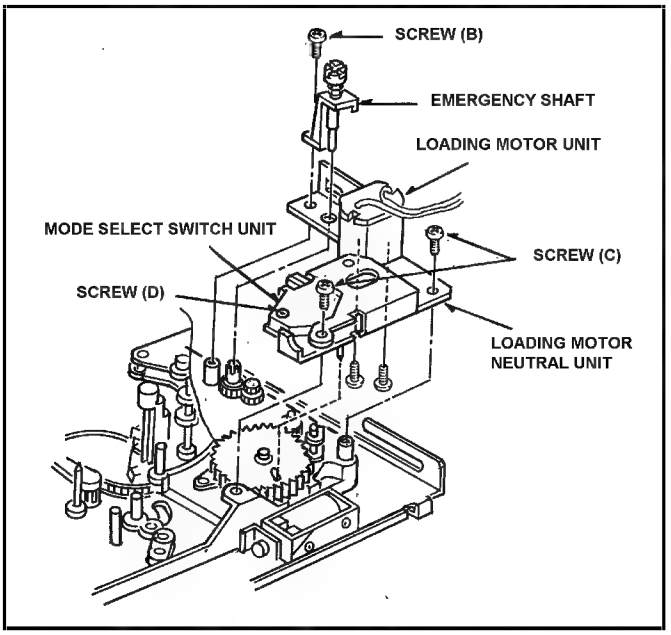


Fig. 6-7-1 Remove of Mode Select Switch Unit

6-8. Cleaning Arm Unit Replacement

(Removal)

1. Remove the Top Case Unit.
2. Unscrew the 2 screws (A) and remove the T1 Guide.
3. Hang off the tip portion (B) of cleaning Arm Unit and hang off the spring from Cleaner Arm Unit, then remove the Cleaning Arm Unit as shown in Figure 6-8-1.

(Installation)

1. Install the Cleaning Arm Unit, then hang on the spring to Cleaning Arm Unit.
2. Install the T1 Guide by tightening 2 screws (A).
3. Press the iron core of the Cleaner Solenoid and confirm that the Cleaner Roller is rotated, when the cylinder is rotated by hand.
4. T1 Guide position adjustment should be performed as follows.

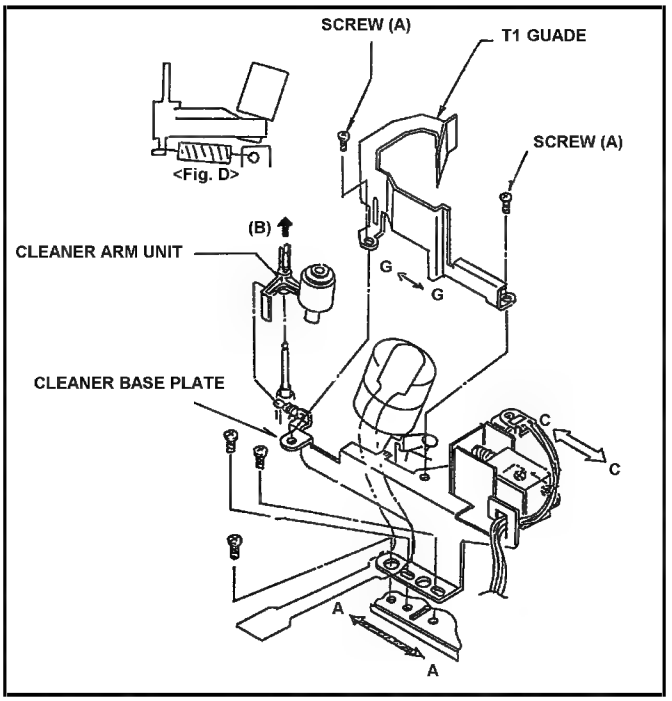


Fig. 6-8-1 Removal of Cleaner Roller Unit

6-8-1. T1 Guide Position Adjustment

Place the Loading completed position.

< How to making the Loading Condition >

- Open the "Servo Adjust" menu in the "Service Menu".
- Select the item "T TORQUE" and press the ENTER button for making the loading condition and turn power to off.

1. Observe the clearance (B) between T1 Guide and T1 post as shown in Figure 6-8-2. And make sure that it is within 0.2 to 0.5mm.
2. If not, loosen the 2 screws (A) and adjust the position of T1 Guide by moving arrow direction (G ⇔ G) so that the clearance (B) is within specification. And tighten the 2 screws (A).

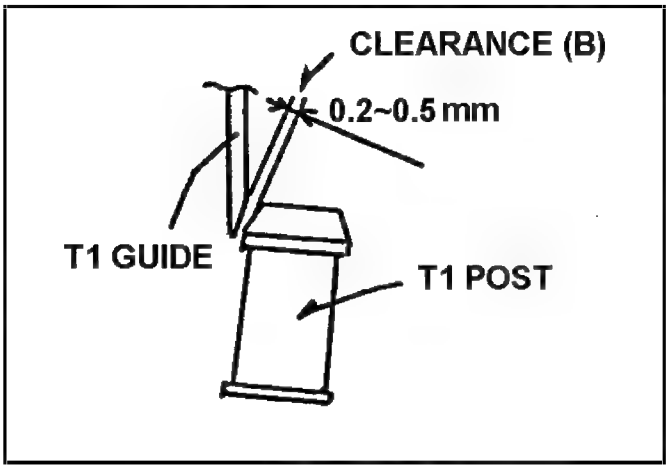


Fig. 6-8-2 Adjust of T1 Guide

6-9. Pinch Solenoid Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shile Plate.
5. Disconnect the connector P20 on the Servo P.C.Board as shown in Figure 6-3-1.
6. Unscrew the 2 screws (A) and remove the Pinch Solenoid Unit as shown in Figure 6-9-1.
7. Unscrew the 2 screws (B) and remove the Pinch Solenoid Angle as shown in Figure 6-9-1.
8. Unscrew the 2 screws (C) and remove the Pinch Solenoid from the Pinch Solenoid Base.

(Installation)

1. Install the new Pinch Solenoid follow the removal steps in reverse order.
2. After installation, Pinch Solenoid Position Adjustment is required (Refer to item 5-2).

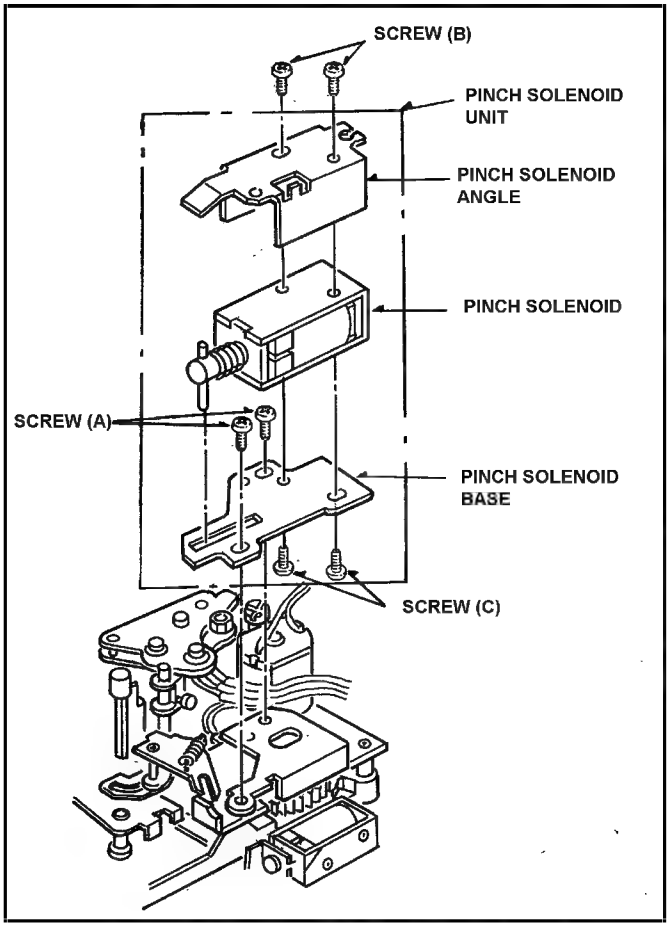


Fig. 6-9-1. Removal of Pinch Solenoid

6-10. Supply Brake Solenoid Replacement and Adjustment

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Disconnect the connector P15 on the Mech I/F P.C.Board.
6. Unscrew the 2 screws (A) and remove the Supply Brake Solenoid Base Unit as shown in Figure 6-10-1.
7. Unscrew the 2 screws (B) and remove the supply Brake Solenoid from Supply Brake Solenoid Base Unit as shown in Figure 6-10-1.

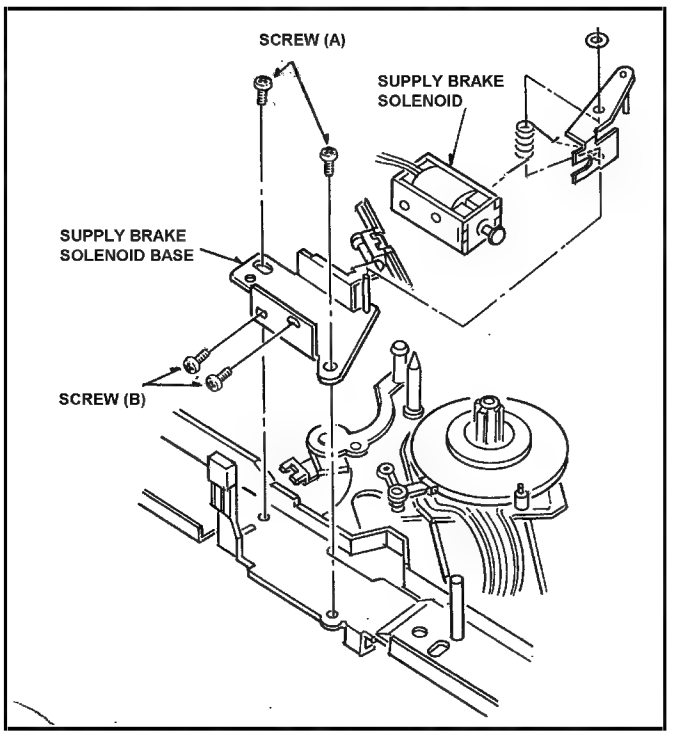


Fig. 6-10-1 Removal of Supply Brake Solenoid

(Installation)

1. Install the new supply Brake Solenoid follow the removal steps in reverse order.

(Adjustment)

1. Place the reels in the M cassette size position.
2. Observe the clearance (A) between Brake pad and it's turntable as shown in Figure 6-10-2. And make sure that it is within 0.2 to 0.5mm.
3. If not, loosen the 2 screws (A), which fixed supply and Take Up Brake Solenoid Unit. And adjust the position of Brake Solenoid Unit by moving arrow direction so that the clearance (A) is within specification. And tighten the 2 screws (A).
4. After adjustment, change the reel position to S and L cassette size, and confirm that the clearance (A) is within specification.

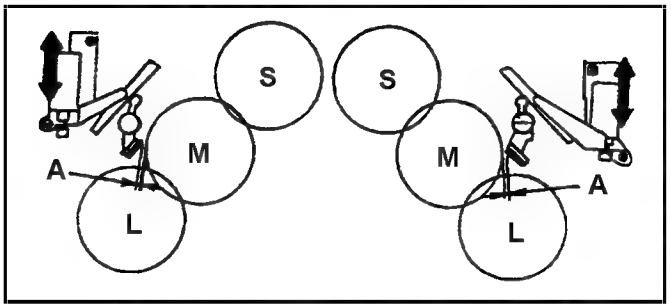


Fig. 6-10-2 Brake Solenoid Adjustment

6-11. Take Up Brake Solenoid Replacement and Adjustment

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Disconnect the connector P18 on the Servo P.C.Board.
6. Unscrew the 2 screws (A) and remove the Take Up Brake Solenoid Base Unit as shown in Figure 6-11-1.
7. Unscrew the 2 screws (B) and remove the Take Up Brake Solenoid from Take Up Brake Solenoid Base Unit as shown in Figure 6-11-1.

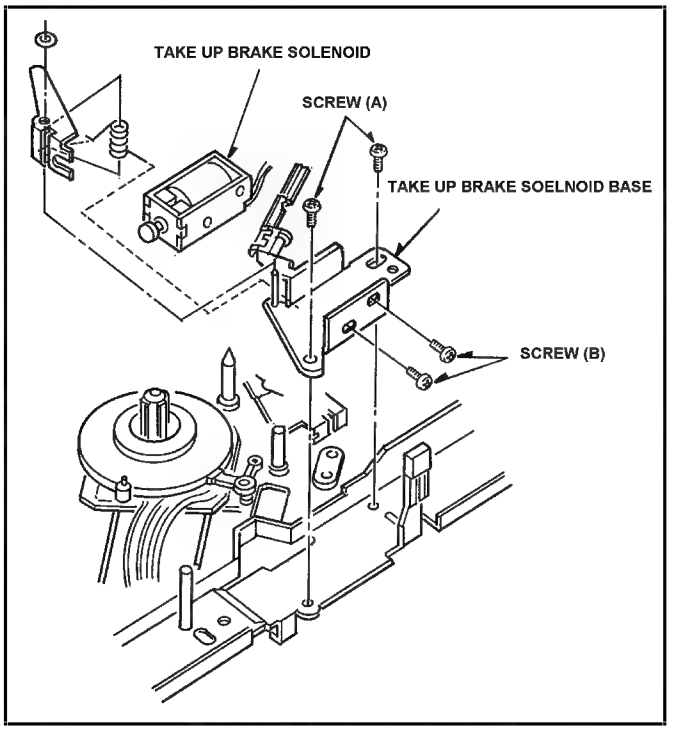


Fig. 6-11-1 Removal of Take Up Brake Solenoid

(Installation)

1. Install the new Take up Brake Solenoid follow the removal steps in reverse order.

Note: Hang on the Take up Brake Spring as shown in Figure 6-11-1.

2. After installation, position adjustment should be performed as follows.

(Adjustment)

1. Please adjust the position of Take up Brake Solenoid Unit follow the adjustment procedure, which is described item 6-10.

6-12. Distinction SW Unit Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Disconnect the connector P17 on Servo P.C.Board.
6. Unscrew the 3 screws (A) and remove the Distinction SW Unit as shown in Figure 6-12-1.

(Installation)

1. Install the new Distinction Switch Unit follow the removal steps in reverse order.
2. Confirm that the M and L cassettes touch to Distinction Switch Unit correctly.

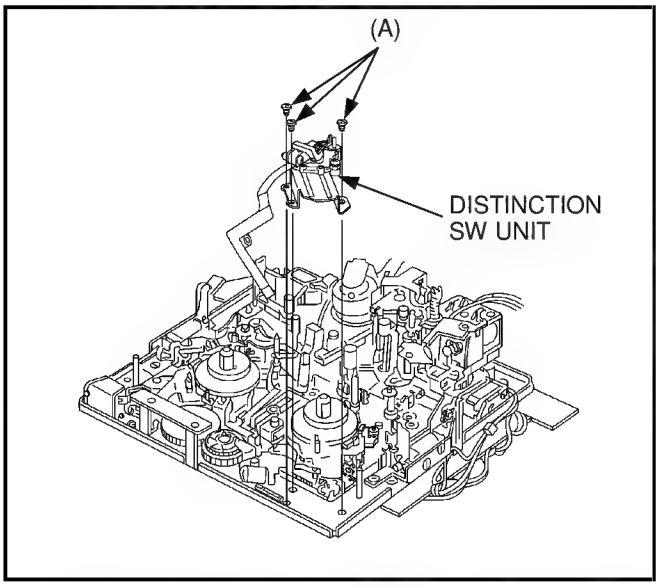


Fig. 6-12-1 Removal of Distinction Switch Unit

6-13. S1 Post Loading Arm Unit Replacement and Adjustment

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the S5 Post Base Unit (Refer to item 6-17).
4. Remove the Tension Arm Unit(Refer to item 6-18).
5. Unscrew the screw (A) and remove the S1 Post from Loading Rail as shown in Figure 6-13-1.
6. Remove the Cut Washer (B) and remove the S1 Loading Arm Unit as shown in Figure 6-13-1.

(Installation)

1. Install the new S1 Loading Arm Unit follow the removal steps in reverse order, then S1 Post Loading Arm Unit Phase Adjustment should be performed as follows.
2. After installation, confirm that the S1 Post moving smoothly on the Loading Rail.
3. Tension Arm (Refer to item 5-5) and Linearity Adjustment. (Refer to item 5-13) should be performed.

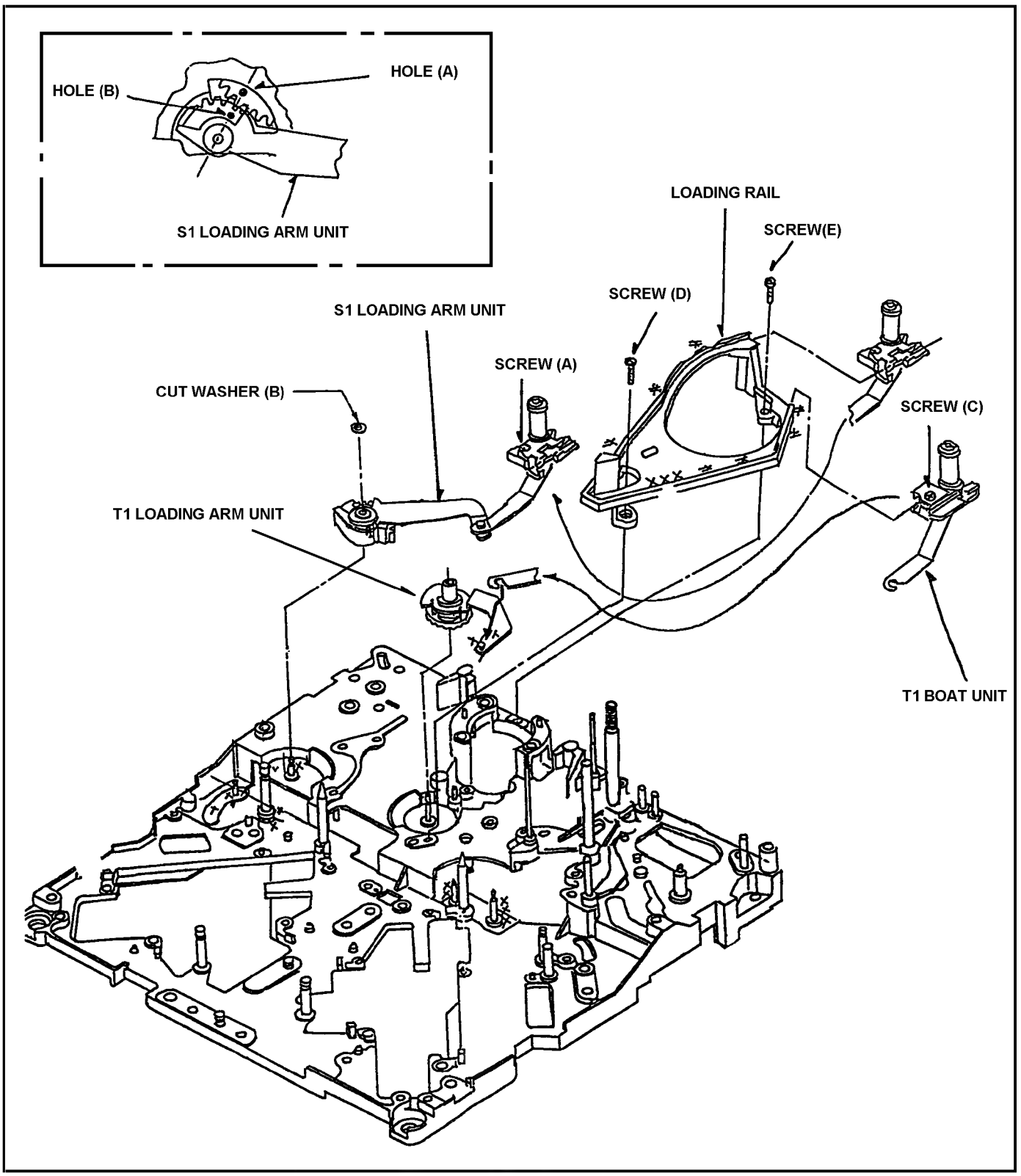


Fig. 6-13-1 Removal of S1 Post Loading Arm Unit

(Adjustment)

1. When install the S1 Post Loading Arm Unit, then the hole (A) should be matched hole (B) as shown in Figure 6-13-1.

6-14. T1 Boat Unit Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Unscrew the screw (C) and remove the T1 Post from Loading Rail as shown in Figure 6-13-1.
4. Hang off the T1 Boat Unit from T1 Loading Arm Unit as shown in Figure 6-13-1.

(Installation)

1. Install the new T1 Boat Unit follow the removal steps in reverse order.
2. After installation confirm that the T1 Post moving smoothly on the Loading Rail.
3. Linearity adjustment (Refer to item 5-13) should be performed.

6-14-1. T1 Loading Arm Unit Replacement and Adjustment

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the cylinder Unit (Refer to item 6-1).
4. Move the T1 Post to loading direction by manual ejecting method until the screw (D) can be removal position as shown in Figure 6-13-1.
5. Unscrew the 2 screws (A) and (C), then remove the S1 and T1 Post from Loading Rail as shown in Figure 6-13-1.
6. Unscrew the 2 screws (D) and (E), then remove the Loading Rail as shown in Figure 6-13-1.
7. Remove the T1 Loading Arm Unit as shown in Figure 6-13-1.

(Installation)

1. Install the T1 Loading Arm Unit follow the removal steps in reverse order, then Phase Adjustment should be performed as follows.

Note: This replacement should be performed simultaneously, replacement of Cylinder Unit. It is convenience for Replacement of T1 Loading Arm Unit.

(Adjustment)

1. When install the T1 Loading Arm Unit, then the hole (A) should be matched hole (B) as shown in Figure 6-14-1.
2. After installation confirm that the S1 and T1 Post moving smoothly on the Loading Rail.
3. Post Height Pre-adjustment (Refer to item 5-5) and Linearity adjustment (Refer to item 5-18 [Tape Pass Adjustment Procedure]) should be performed.

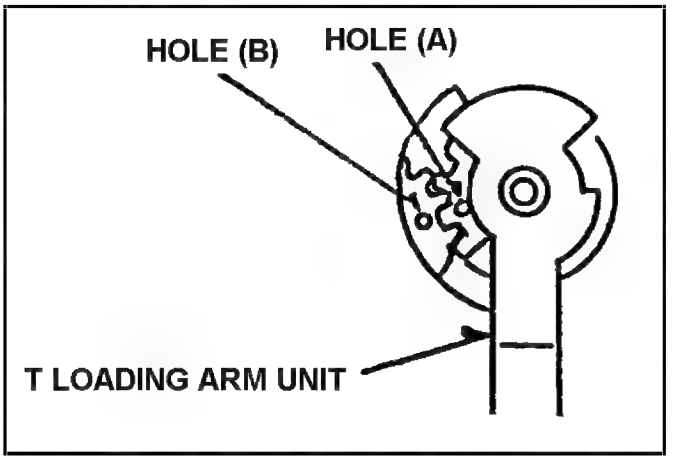


Fig. 6-14-1 Phase Adjustment of T1 Loading Arm Unit

6-15. Cleaner Solenoid Replacement and Adjustment

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Disconnect the connector P37 on the Servo P.C.Board.
6. Unscrew the 2 screws (A) and remove the Cleaner Solenoid Unit as shown in Figure 6-15-1.
7. Unscrew the 2 screws (B) and remove the Cleaner Solenoid as shown in Figure 6-15-1.

(Installation)

1. Install the new Cleaner Solenoid follow the removal steps in reverse order.
2. After installation, Cleaner Solenoid Position adjustment should be performed as follows.

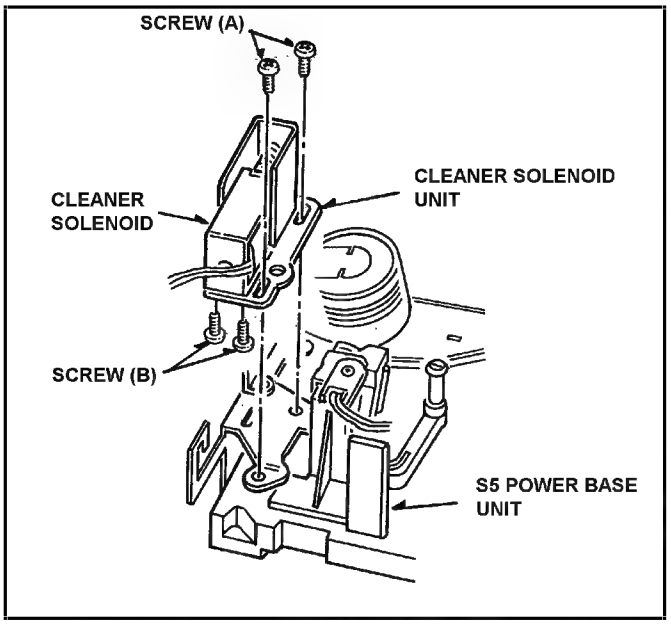


Fig. 6-15-1 Removal of Cleaner Solenoid

6-15-1. Cleaner Solenoid Position Adjustment

※ Tools Required : Eccentric Driver (VFK0357)

1. Press the iron core of Cleaner Solenoid.
2. Observe the clearance (D) between Cleaning Arm Unit and Cleaner Base Plate as shown in Figure 6-15-2. And make sure that it is within 0.5 to 0.7mm.
3. If not, loosen the 2 screws (A) and adjust the position of Cleaner Solenoid Unit by moving arrow direction (C⇔C) using the Eccentric drive so that the clearance (D) is within specification. And tighten the 2 screws.
4. After adjustment, confirm that as follow.
5. Press the iron core of Cleaner Solenoid and released it, then the Cleaning Roller is return to original position.
6. Press the iron core of the Cleaner Solenoid and confirm that the Cleaner Roller is rotated, when the Cylinder is rotated by hand.

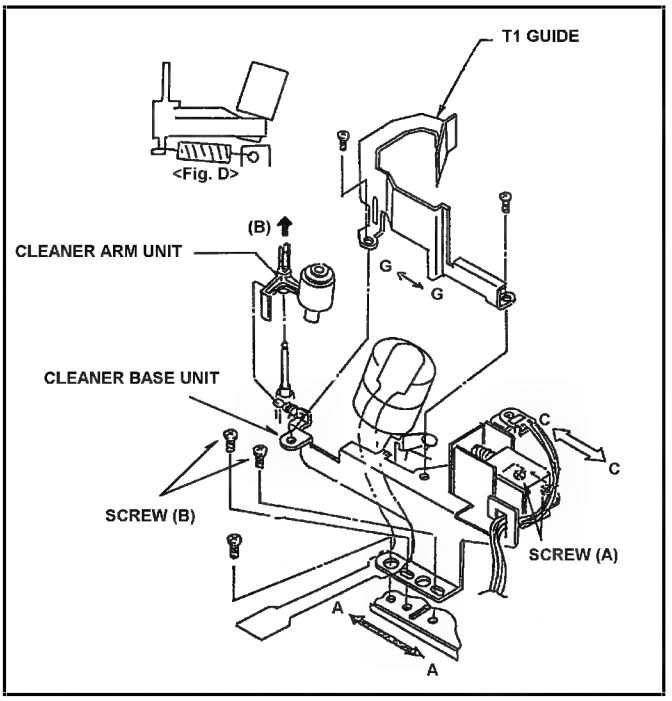


Fig. 6-15-4 Cleaner Solenoid Position Adjustment

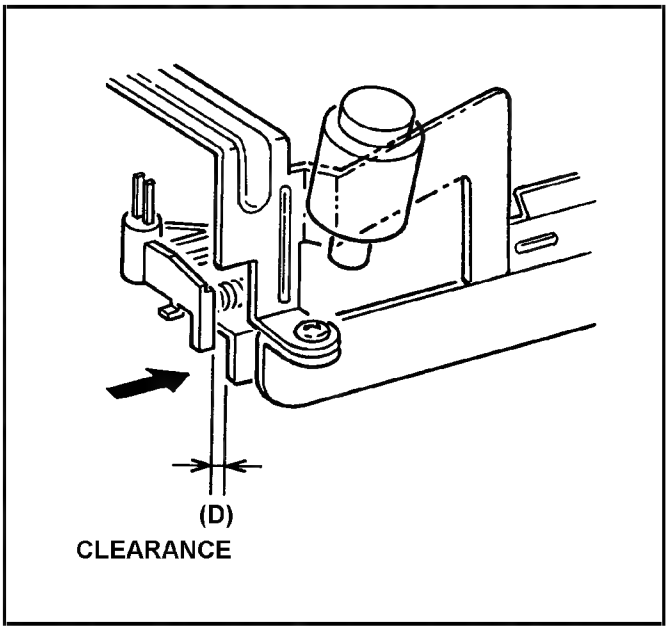


Fig. 6-15-2 Cleaner Solenoid Position Adjustment

Note: If remove the cleaner Base Plate, Cleaner roller Position adjustment should be performed.

6-15-2. Cleaner Roller Position Adjustment

※ Tools Required : Eccentric Driver (VFK0357)

1. Observe the clearance (A) between Cleaner Roller and cylinder Unit as shown in Figure 6-15-3. And make sure that it is within 1.0 to 1.2mm.
2. If not, loosen the 2 screws (B) and adjust the position of Cleaner Base Plate by moving arrow direction (A ⇔ A) using the Eccentric driver so that the clearance (A) is within specification. And tighten the 2 screws (B).

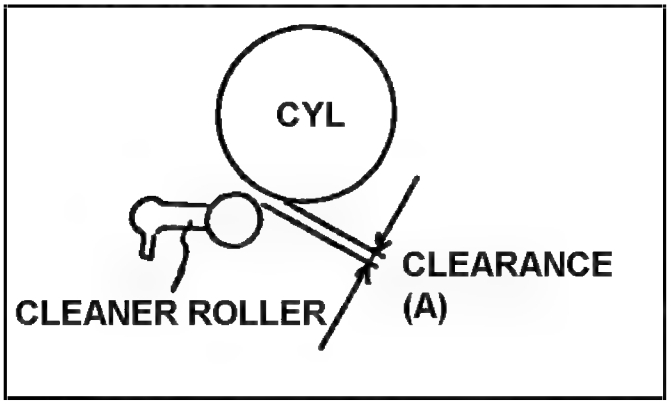


Fig. 6-15-3 Cleaner Roller Position Adjustment

6-16. Reel Drive Motor Unit Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Disconnect the connector P16 on the Servo P.C.Board.
6. Unscrew the 2 screws (A) and remove the Reel Drive Sensor P.C.Board as shown in Figure 6-16-1.
7. Unscrew the 2 screws (B) and remove the Reel Drive Motor Unit as shown in Figure 6-16-1.

(Installation)

1. Install the new Reel Drive Motor Unit follow the removal step in reverse order.

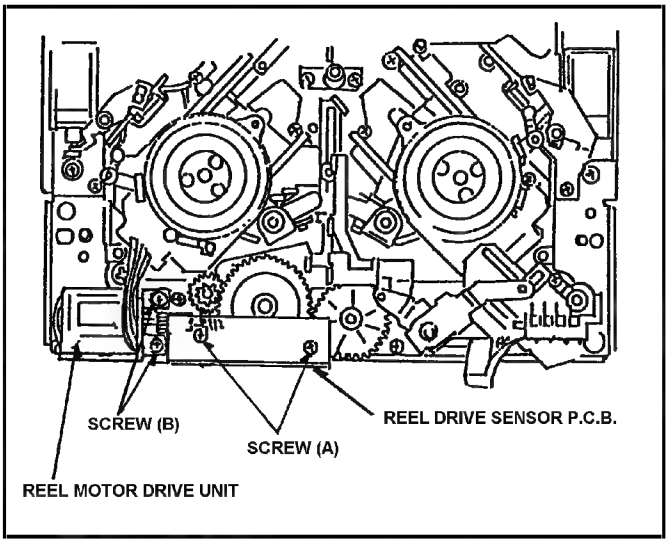


Fig. 6-16-1 Removal of Reel Drive Motor Unit

6-17. S5 Post Base Unit Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Unscrew the screw (A) and remove the S5 Post Base Unit as shown in Figure 6-17-1.

(Installation)

1. Install the S5 post Base Unit follow the removal steps in reverse order, then be careful the S5 Post Base Unit is install to mech chassis as shown in Figure 6-17-1.
2. After installation, Post Height pre-adjustment (Refer to item 5-4) and Linearity adjustment (Refer to item 5-12 [Tape Pass Adjustment Procedure]) should be performed.

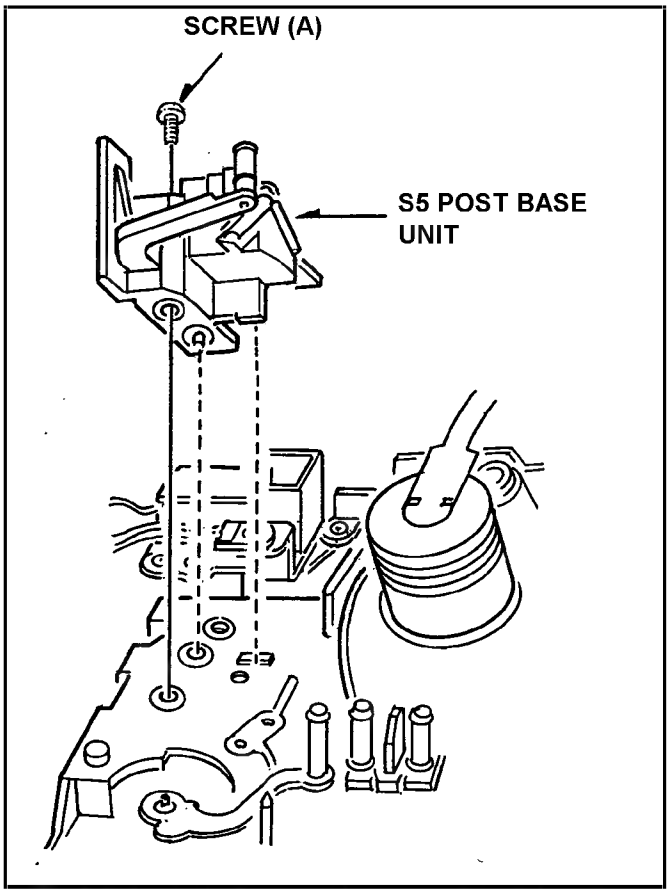


Fig. 6-17-1 Removal of S5 Post Base Unit

6-18. Tension Arm Unit Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Cut Washer (A) and hang off the Tension Regi Spring, then remove the Tension Arm Unit as shown in Figure 6-18-1.

(Installation)

1. Install the new Tension Arm Unit follow the removal steps in reveres order.
2. After installation, Tension Arm Adjustment should be performed the following steps.

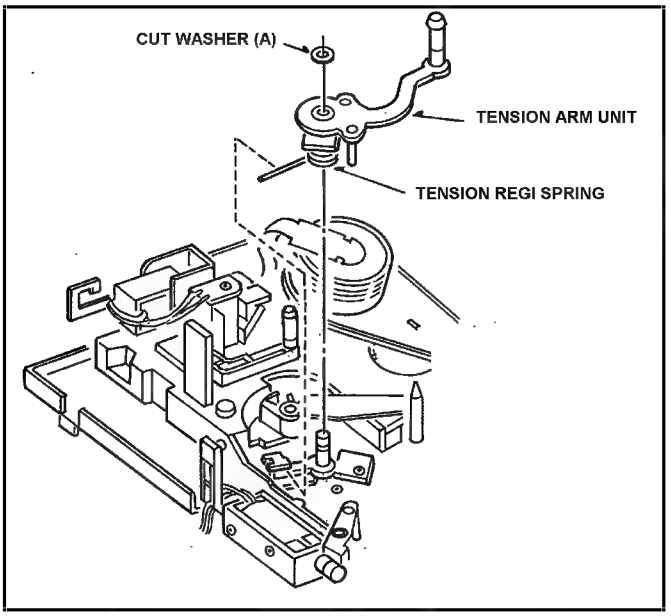
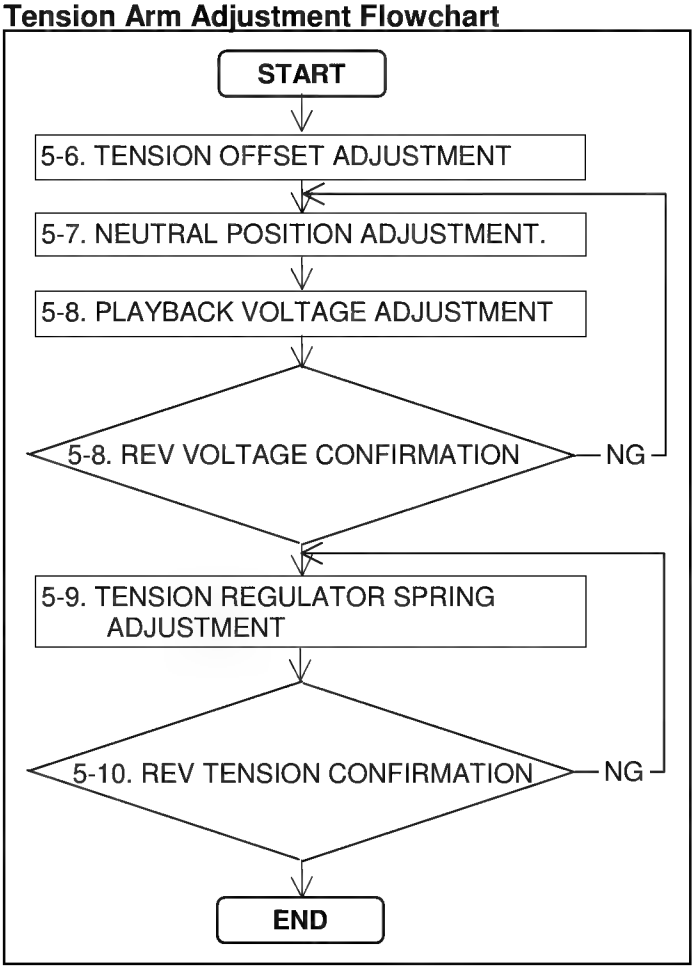


Fig. 6-18-1 Removal of Tension Arm Unit

Tension Arm Adjustment Flowchart



6-19. Main Cam Gear Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Pinch Solenoid Unit (Refer to item 6-5) and Loading Motor Neutral Unit (Refer to item 6-4).
4. Remove the Main Cam Gear as shown in Figure 6-19-1.

(Installation)

1. Install the Main Cam Gear, then the pin of Main Cam Arm Unit (※) should be matched with the groove position of Main Cam Gear as shown in Figure 6-19-1.
2. Follow the removal steps in reverse order.
3. After installation, Pinch Solenoid Position Adjustment is required (Refer to item 5-2).

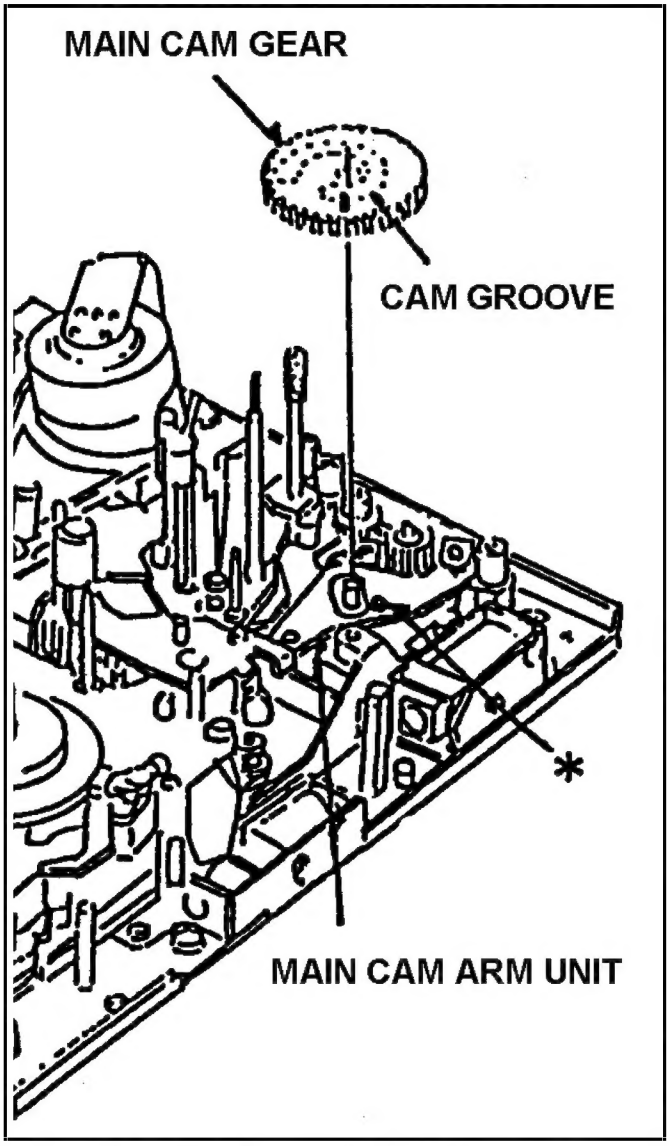


Fig. 6-19-1 Removal of Main Cam Gear

6-20. M-Stopper Solenoid Replacement And Adjustment

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Remove the connector P24 on the Servo P.C.Board.
6. Unscrew the 4 screws (A) and (B) and remove the M-Stopper Solenoid as shown in Figure 6-20-1.

(Installation)

1. Install the new M-Stopper Solenoid follow the removal steps in reverse order.
2. After installation, position adjustment should be performed as follows.

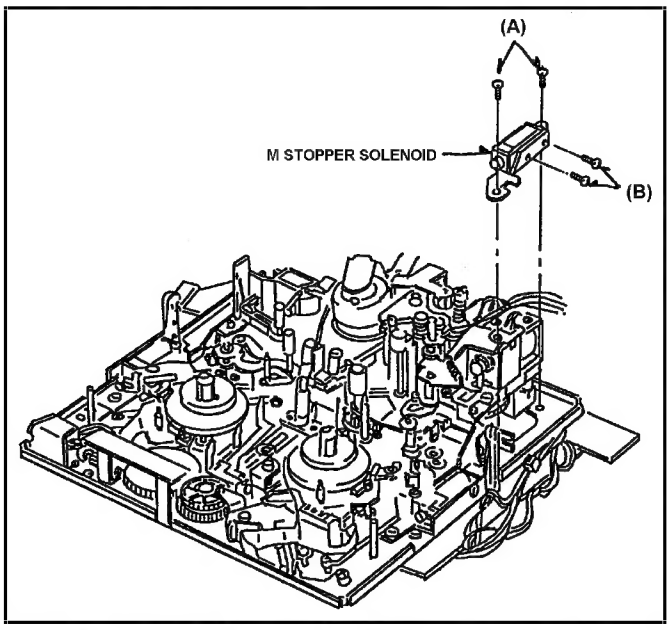


Fig. 6-20-1 Removal of M-Stopper Solenoid

(Adjustment)

1. Place the reels in the L size position.
2. Push the iron core of M-Stopper Solenoid by hand.
3. Observe the clearance (A) between Mech Chassis and M-Stopper as shown in Figure 6-20-2. And make sure that it is within 1.1 to 1.3mm.
4. If not, loosen the 2 screws (A), which fixed M-Stopper Solenoid. And adjust the position of M-Stopper Solenoid so that the clearance (A) is within specification. And tighten the 2 screws (A).

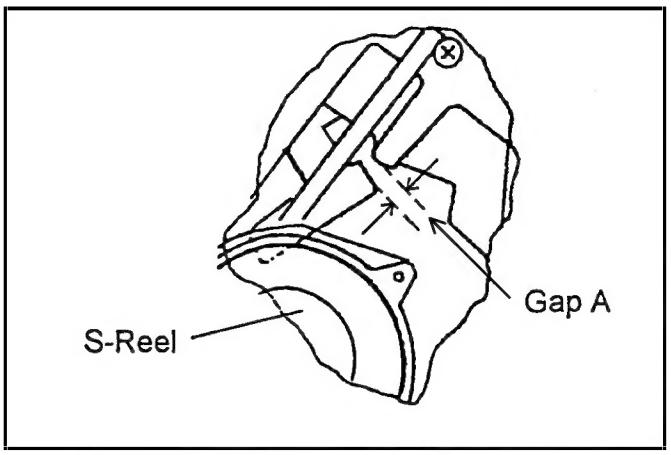


Fig. 6-20-2 M-Stopper Solenoid Adjustment

6-21. L-M Release Angle Unit Replacement

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Unscrew the 2 screws (A) and remove the L-M Release Angle Unit as shown in Figure 6-21-1.

(Installation)

1. Install the new L-M Release Angle Unit follow the removal steps reverse order.

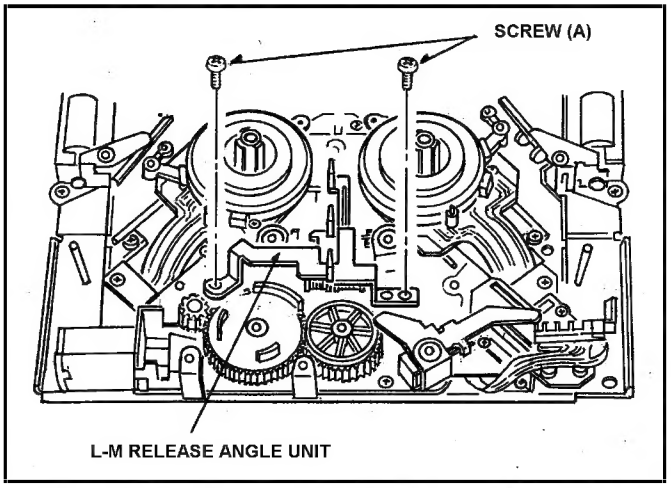


Fig. 6-21-1 Removal of L-M Release Angle Unit

6-22. Slide Rod Unit Replacement and Adjustment

(Removal)

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the L-M Release Angle Unit. (Refer to item 6-21).
4. Remove the Reel Drive Sensor P.C.Board (Refer to item 6-16).
5. Remove the Cut Washer (A) and remove the Reel Drive Cam Gear.
6. Remove the Cut Washer (B) and remove the MIC Drive Arm Unit.
7. Remove the Cut Washer (C) and remove the MIC Geneva Gear.
8. Remove the Cut Washer (D) and remove the Reel Drive Arm Unit as shown in Figure 6-22-3.
9. Remove the Supply and Take Up Reel Rotor Unit (Refer to item 6-3-1).
10. Remove the 2 Cut Washers (E) and remove the Supply and Take Up Base Drive Arm Unit.
11. Remove the 2 Cut Washers (F) and remove the Slide Rod Unit.

(Installation)

1. Install the new Slide Rod Unit follow the removal steps in reverse order.
2. When install the Reel Drive Cam Gear and MIC Geneva Gear, then phase adjustment should be performed as follows.

(Adjustment)

1. Install the MIC Geneva Gear to the Chassis.
2. Place the Reels in the M-Size position by hand.
3. Install the MIC Drive Arm Unit.
4. Place the Distinction SW U. in nearest position from the Reel Table by rotation of MIC Geneva Gear, and then MIC Geneva Gear should be positioned as shown in Figure 6-22-2.

Note: Protrusion of MIC DRIVE Arm Unit is positioned as shown in Figure 6-22-2.

5. Install the Reel Drive Cam Gear and hole of Reel Drive Cam Gear should be matched with the hole of MIC Geneva Gear as shown in Figure 6-22-2.
6. Install the Cut Washer (A), (B) and (C) as shown in Figure 6-22-2.

※Point of Adjustment

1) Reel in M-Size position.
2) Set the Distinction SW U. to nearest position from the Reel Table.
3) Portrusion of MIC Drive Arm Unit is positioned as shown in Figure 6-22-2.
4) Holes between Reel Drive Cam Gear and MIC Geneva Gear are matched.

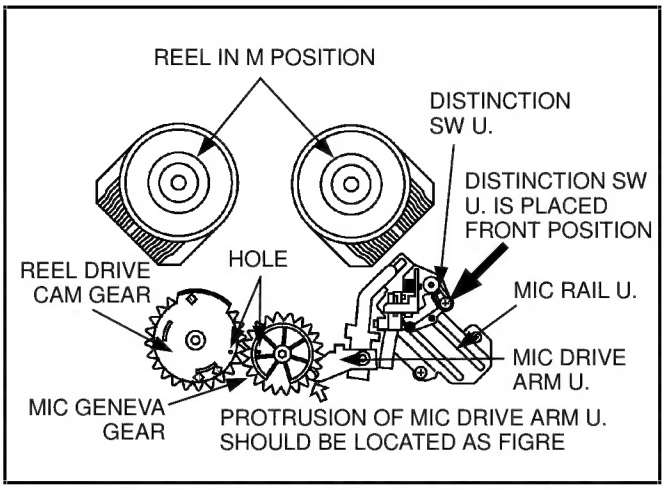

REEL IN M POSITION
DISTINCTION SW U.
DISTINCTION SW U. IS PLACED FRONT POSITION
HOLE
REEL DRIVE CAM GEAR
MIC RAIL U.
MIC DRIVE ARM U.
MIC GENEVA GEAR
PROTRUSION OF MIC DRIVE ARM U. SHOULD BE LOCATED AS FIGRE

Fig. 6-22-2 Gear Phase Adjustment

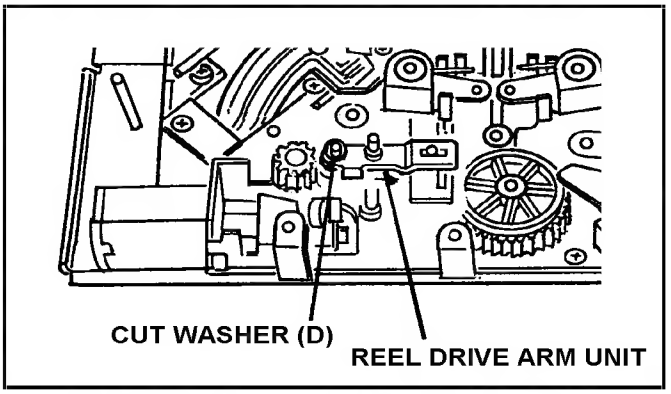


Fig. 6-22-3 Removal of Reel Drive Arm Unit

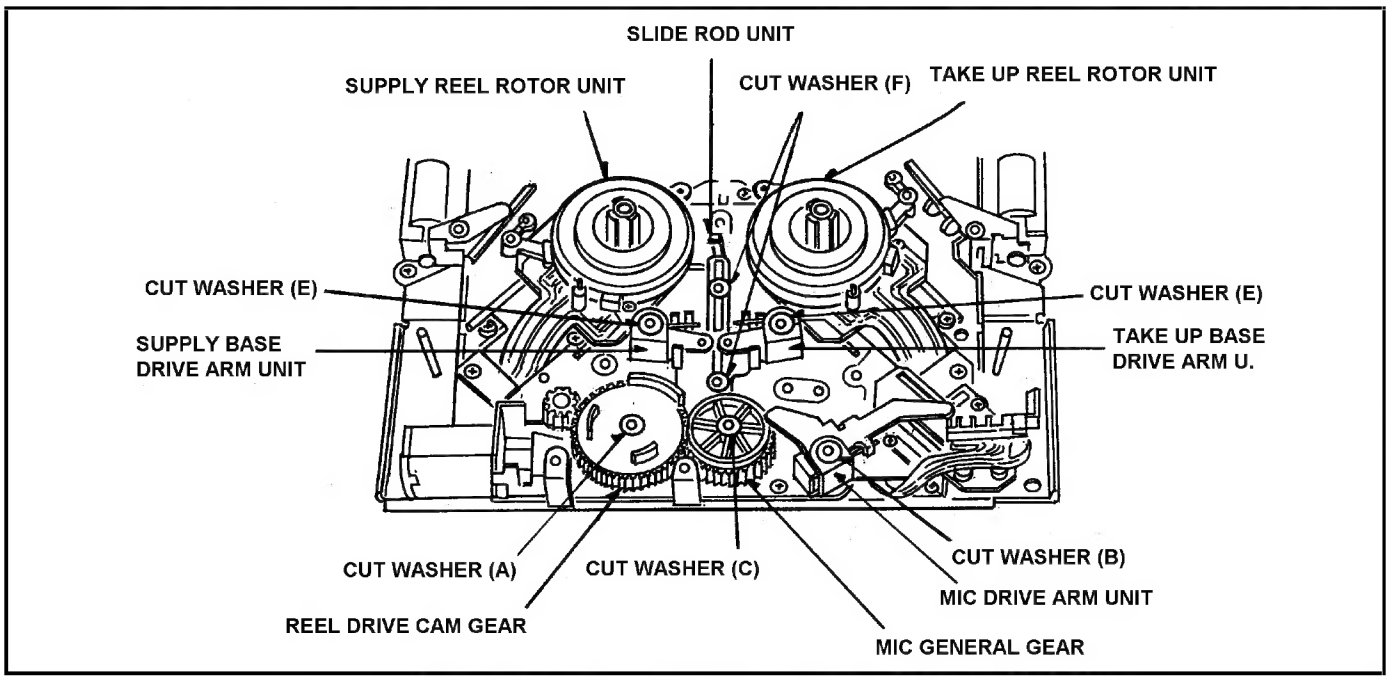


Fig. 6-22-1 Removal of Slide Red Unit

6-23. T4 Post Phase Adjustment

1. Confirm that the hole (B) of T4 connection Gear was matched to hole of T4 post as shown in figure 6-23-1.
2. Confirm that the portion (C) of T4 connection Gear and hole (A) , which are located as shown in figure 6-23-1.

Note: This confirmation should be performed on unloading condition.

3. If not, adjust the phase of T4 post follow the above procedure.

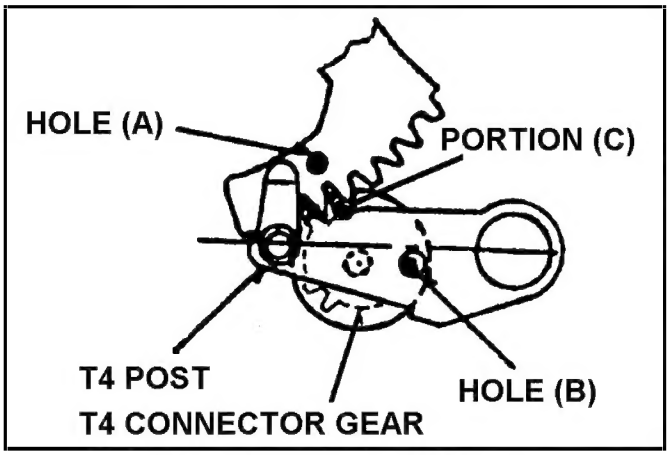


Fig. 6-23-1 Phase of T4 Post

6-24. Thrust Adjustment Screw Replacement and Adjustment

1. Remove the Thrust Adjustment Screw.
2. Enforce cleaning of point department of capstan shaft with an applicator.
3. Put the oil(VFK0906) on a new Thrust Adjustment Screw and install the upper end of the Capstan Housing.
4. Turn the Thrust Adjustment Screw slowly to counter-clockwise until the Capstan Rotor just starts turning (separate from the Capstan Rotor).
5. Turn the Trust Adjustment Screw an another angle of 270° from 180° (about 225°) clockwise as shown in Fig. 6-24-2.
6. Put the glue (Ex:: Three Bond 1401B) on the Thrust Adjust Screw.
7. Confirm whether the Oil Seal does not come in contact with the Capstan Housing.

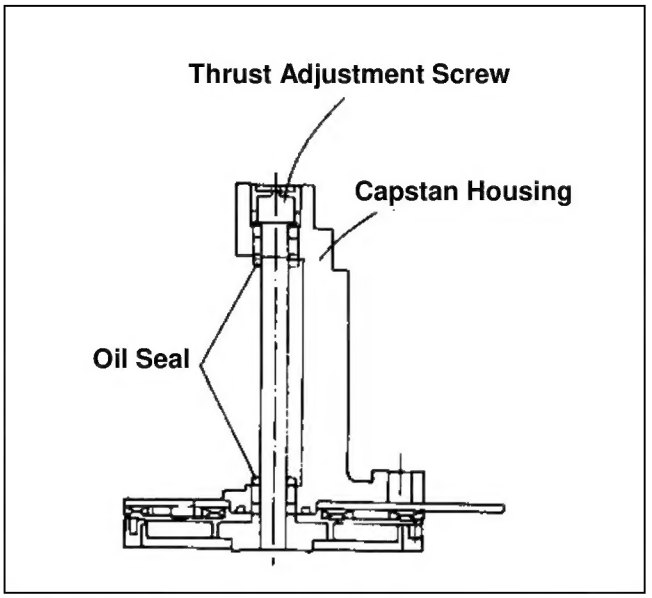


Fig.6-24-1 Removal of Trust Adjustment Screw

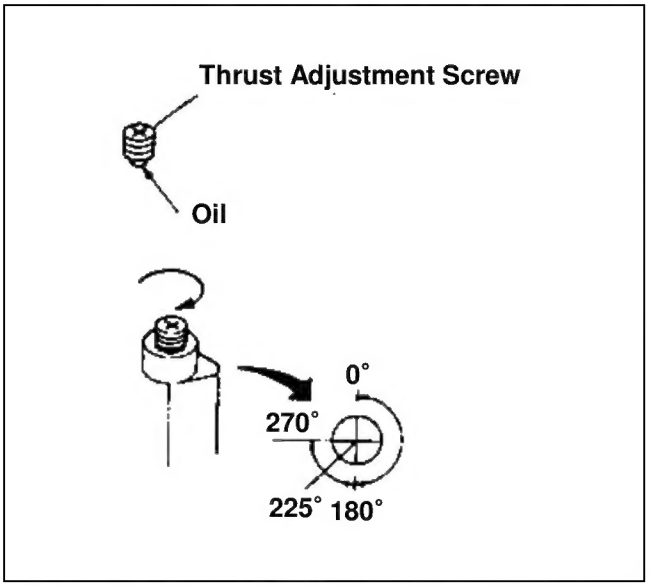


Fig.6-24-2 Adjustment of Thrust Adjustment Screw